FINAL REPORT for APN PROJECT

Project Reference Number: CBA2011-13NSY-Tolentino

Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through Local Capacity and Policy Development in Southeast Asia

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Final Report submitted to APN

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OVERVIEW OF PROJECT WORK AND OUTCOMES

Non-technical summary

The project on the "Institutionalization of Agroforestry as a Climate Change Adaptation Strategy via Local Capacity and Policy Development in Southeast Asia" was a sequel of the 2009 APN-funded project "Scaling-Up Agroforestry Promotion for Climate Change Mitigation and Adaptation in Southeast Asia". The current project, which was implemented in June 2011 was envisioned to help sustain the initiatives of the earlier project in promoting agroforestry as a climate change adaptation strategy. This was done by building the capabilities of the local actors in the development programs, such as the junior lecturers from academic institutions, who are main responsible in transferring the new knowledge and skills to the students; and the local technicians from the local government sectors , who are providing technical assistance to the local farmers. This project likewise recognized the local knowledge of the farmers on climate change adaptation y documenting their farm-level evidences of climate change, observed effects of climate change on their agricultural production, and their adaptation strategies. Because institutionalization of agroforestry requires policy advocacy, this project also dwelled on the current issues and concerns that confront agroforestry promotion, and the corresponding measures to help address those concerns so that agroforestry can be advanced as a development strategy in Southeast Asia. This project was implemented through the collaboration of the six country networks of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia Network for Agroforestry Education (INAFE), Lao Network for Agroforestry Education (LaoNAFE), Malaysia Network for Agroforestry Education (MANAFE), Philippine Agroforestry Education and Research Network (PAFERN), Thailand Network for Agroforestry Education (ThaiNAFE), and Vietnam Network for Agroforestry Education (VNAFE).

Objectives

This project aimed to strengthen the capacities of junior lecturers engaged in agroforestry education programs, and community development workers/agricultural technicians involved in the research and extension programs at the local/community levels, and mainstream agroforestry in the development programs of the local government units/agencies in each of the six collaborating countries in Southeast Asia. Specifically, it intended to a) implement six national training programs on promoting different climate change mitigation and adaptation strategies; b) organize dialogue with the different policy-making bodies at the national and local levels for the integration of agroforestry in their development programs; and c) document climate change adaptation strategies of the upland farmers in selected areas in Southeast Asia.

Amount received and number years supported

The Grant awarded to this project was US$ 35,000

Activities undertaken

The project collaborators have undertaken the major project activities as follows:

1. ***National Training on Climate Change Adaptation Strategies***. This training was conducted in Indonesia, Malaysia, Thailand, Philippines, Lao PDR and Vietnam with the aim of enhancing the knowledge and skills of the junior agroforestry lecturers and agricultural technicians/extension workers from the local governments about the issue on climate change, and the appropriate climate change adaptation strategies which they could apply in their home institutions, or share with the upland farming communities in their respective areas.

2. ***Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers***. This project component was undertaken to assess the understanding and awareness of selected agroforestry practitioners and upland farmers on the issue of climate change and its impacts to their agricultural production systems; identify the indications and evidences of climate change based on the experiences and observations of the agroforestry practitioners and upland farmers in their agricultural production; identify the impacts or effects of climate change on the agricultural production of the selected respondent-upland farmers; analyze the different mechanisms and strategies that are being employed by the agroforestry practitioners/upland farmers in coping with the impacts of climate change; and, formulate recommendations to the concerned national and local development organizations as regards the adoption of appropriate and sound climate change mitigation and adaptation strategies. Among the project collaborators that carried out this project component are Thailand, Malaysia, Indonesia and the Philippines.

3. ***Policy Dialogue on Agroforestry***. This activity was implemented to deliberate on the key issues and policy options towards institutionalizing agroforestry in the countries of the project collaborators. This dialogue served as an opportunity to convene the different agroforestry stakeholders, including the implementers of the agroforestry-related policies and programs. The policy brief that was produced in the 2010 APN-funded project was used as the main reference in the conduct of the policy dialogues in Lao PDR, Vietnam and the Philippines.

4. ***Project monitoring.*** Project monitoring was conducted by PAFERN or the lead project collaborator to ensure that the country activities are on track. Project monitoring is done by actual visit to the project collaborators to discuss the details of the projects assigned to them. Project monitoring was carried out in Indonesia, Thailand and Malaysia.

Results

National Training on Climate Change Adaptation Strategies

- Conducted the National Training on Climate Change Adaptation Strategies in the six collaborating countries, which trained junior agroforestry lecturers and agricultural technicians as shown in the table below:

Collaborating country and national agroforestry education network	Total number of participants	Composition of participants
Philippine Agroforestry Education and Research Network (PAFERN)	34	Junior agroforestry lecturers; and agriculture and environment officers of the local government units
Thailand Network for Agroforestry Education (ThaiNAFE)	20	Junior lecturers and agricultural extension workers
Vietnam Network for Agroforestry Education (VNAFE)	22	Junior lecturers, staff of agriculture extension centers, researchers ofscience and technology institute of forestry and agriculture, staff of forestry department
Indonesia Network for Agroforestry Education (INAFE)	17	Junior lecturers in various universities offering agroforestry education programs

Collaborating country and national agroforestry education network	Total number of participants	Composition of participants
Lao Network for Agroforestry Education (LaoNAFE)	16	Junior lecturers and extension workers
Malaysia Network for Agroforestry Education (MANAFE)	20	Junior lecturers and extension workers

- The national trainings yielded about seven action plans in Indonesia for implementation by a group of participants, and 21 institutional action plans in the Philippines

- The national training provided an opportunity for the national networks to establish linkages with the existing regional organizations in Southeast Asia such as the SEAMEO-BIOTROP and SEAMEO-SEARCA

Policy Dialogue on Agroforestry

- Organized three (3) national policy dialogues in the Philippines, Lao PDR and Vietnam. These policy dialogues served as venues to deliberate on the issues and concerns that confront the promotion of agroforestry in the different countries in Southeast Asia. Specifically, the policy dialogue in the Philippines yielded a draft Executive Order which calls for the institutionalization of agroforestry as a development strategy. The draft Executive Order will be presented to the Office of the President for further action.

Documentation of Climate Change Adaptation Strategies of Selected Agroforestry Farmers

- Documented the farm-level evidences of climate change, its effects on agricultural crop production as observed by the farmers, and the farmers' climate change adaptation strategies. The documentation of climate change adaptation strategies was undertaken in the selected upland farms in the Philippines (represented by two municipalities in Northern Luzon; one municipality in Southern Luzon; one municipality in Visayas; and one municipality in Mindanao). In Indonesia, the documentation focused on the upland farms in Lampung Province, which is represented by a forest park, Wan Abdur Rahman Forest Park; Bandar Lampung Municipal, which represents a conservation forest; Register 22 Way Waya in Central Lampung representing a preserved forest, and a People's Forest in Sungai Langka, South Lampung District. Meanwhile, Thainafe documented the climate change adaptation strategies of farmers representing the upland farms in Eastern Thailand, Northern Thailand, and Southern Thailand.

Relevance to the APN Goals, Science Agenda and to Policy Processes

This project was highlighted by two major goals which are the capacity development of junior scientists and development workers from local government units in the area of climate change adaptation, and mainstreaming agroforestry development programs in their development programs through policy advocacy. These major goals are both consistent with the APN's goal of improving the scientific and technical capacities of nations in the region including the transfer of know-how and technology; strengthening appropriate interactions among scientists and policy-makers; and supporting regional collaboration in global change research on issues that are relevant to the region.

Self evaluation

This project was indeed a very relevant and timely initiative because it dwells on the climate change adaptation strategies that could help the upland farming communities, in particular, and the

agriculture sector, in general in the five collaborating countries to adapt to the impacts of climate change. This project has likewise provided opportunities to establish linkages with the regional institutions in Southeast Asia, particularly the SEAMEO-BIOTROP in Indonesia and SEAMEO-SEARCA in the Philippines. These two institutions served as the co-sponsors of the National Training on Climate Change Adaptation Strategies in Indonesia and the Philippines. Despite the limited budgetary allocation, the activities were implemented by the six collaborating countries as planned. As in the previous APN-funded project, this project has proven the commitment and support of the project collaborators in sharing/counterparting their technical and physical, financial and other resources to effectively carry out the project activities.

Potential for further work

The results of the "Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers in Southeast Asia" indicate that the local farmers have limited options in adapting to the impacts of climate change. While most of the respondents are already aware about climate change, they lack the technical assistance from the local development organizations regarding the different climate change adaptation strategies. While they make full use of their local knowledge, it would also be better if these are complemented with other alternatives/options to be able to maximize their agricultural production. Therefore, the project collaborators recognize the need to build the technical capabilities of the local/upland farmers to enhance their capacities to adapt to the impacts of climate change, including strategies that could help them develop and/or improve their farming systems to become more resilient to climate change impacts and other external shocks. In addition, the institutional action plans that were formulated by the training participants could best be monitored if these are being implemented by the participants. These action plans were all geared towards enhancing the capacities of either their own institutions or their partner farming communities to adapt to the impacts of climate change. There were 21 institutional action plans in the Philippines, and seven major action plans in Indonesia.

Publications (please write the complete citation)

Tolentino, LL, LD Landicho and RD Cabahug. 2011. Promoting Agroforestry as a Climate Change Adaptation Strategy in Southeast Asia: Experience of the Philippine Agroforestry Education and Research Network. In: Proceedings of the ISSAAS International Congress held in Bogor, Indonesia on November 7-10, 2011.

Tolentino, LL, LD Landicho and RD Cabahug. 2011. Towards Instituionalization of Agroforestry as a Climate Change Adaptation Strategy in Southeast Asia: Experience of PAFERN. Paper presented in the 5th National Agroforestry Congress, November 18-19, 2011, Pampanga, Philippines

Acknowledgments

The project proponent acknowledge the commitment and support of the six collaborating countries particularly the country network coordinators of INAFE, LaoNAFE, MANAFE, PAFERN, ThaiNAFE, and VNAFE. Due recognition is also given to SEAMEO-BIOTROP and SEAMEO-SEARCA for co-organizing and co-sponsoring the National Training programs in Indonesia and Philippines. Most of all, the project collaborators extend their gratitude to the upland farmers who served as the respondents of the project component "Documentation of Climate Change Adaptation Strategies Among the Selected Upland Farmers in Southeast Asia". The APN is also recognized for the continuous provision of funding support, without which, this endeavor would not have been possible.

TECHNICAL REPORT

Minimum 15-20 pages (excluding appendix)

Preface

Several studies and literature have indicated the relevance of agroforestry as one of the climate change adaptation strategies of the agriculture sector, particularly those in the marginal areas, which are the most vulnerable areas to the impacts of climate change. This report highlights the experiences of PAFERN in implementing the project 'Institutionalizing Agroforestry as a Climate Change Adaptation Strategy via Local Capacity and Policy Development in Southeast Asia", with the hope of inspiring other regional and national institutions in Southeast Asia to collaborate and come up with proactive and more intensive information dissemination and capacity-building programs to enhance the capacities of the upland farmers, agricultural technicians and extension workers of the local government units, academic and research institutions to adapt to the impacts of climate change.

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1.0 Introduction

This project on "Institutionalizing Agroforestry as a Climate Change Adaptation Strategy via Local Capacity and Policy Development in Southeast Asia" is a follow-up or second phase of the project entitled "Scaling-Up Agroforestry Promotion for Climate Change Mitigation and Adaptation in Southeast Asia" that was conducted in June 2009 to June 2010 through the funding support of the APN. The said project enabled the project team representing Indonesia, Lao PDR, Thailand, Vietnam and the Philippines to create public awareness about the potentials of agroforestry in climate change mitigation and adaptation. In addition, said project was able to document that indeed, agroforestry is gaining recognition as one of the development strategies in the five collaborating countries.

As a follow-up activity, the current project aimed to strengthen the capacities of the junior lecturers engaged in agroforestry education programs, and community development workers/agricultural technicians involved in research and extension programs, and mainstream agroforestry in the development programs of the local government units in each of the six collaborating countries. Specifically, this project was conceived with the following objectives:

1. To implement six national training programs on promoting different climate change mitigation and adaptation strategies in Southeast Asia
2. To conduct dialogue with the different policy-making bodies at the national and local levels for the integration of agroforestry in their development programs
3. To document climate change adaptation strategies of the upland farmers in selected areas in the collaborating countries

To achieve the project objectives, there were three major component activities that were implemented, namely: National Training on Climate Change Adaptation Strategies in the six collaborating countries; Policy Dialogue in Agroforestry in Lao PDR, Vietnam and the Philippines where a number of agroforestry education, research and development programs are continuously being implemented for years already; and the Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers in the Philippines, Malaysia, Thailand and Indonesia. The project collaborators opted not to hold face-to-face meetings as these would incur too much costs. Instead, the progress of project implementation was monitored through emails and project monitoring which was headed by PAFERN representatives. Three project monitoring activities were conducted in Indonesia, Malaysia, and Thailand.

The project served as an initial step towards the institutionalization of agroforestry as a climate change adaptation strategy, in particular, and a development strategy, in general in Southeast Asia. This was carried out through capacity development of the junior scientists from the higher learning institutions, and the community development workers/technicians from the local government agencies that are primarily in charge of extension and community development activities. Thus, this project has generated new knowledge that could be contributed to the science of agroforestry; promoted scientific capacity development in the region by training the different stakeholders, and exchanging technical information and expertise. The major project components are all geared towards policy development at the local level, and therefore, the rate of dissemination and awareness building would surely be more efficient. These features of the current project, therefore, is indeed in line with the APN Goals and Science Agenda, Scientific Capacity Development and Sustainable Development.

The project activities were carried out effectively through the active participation and partnership of the six collaborating national agroforestry education networks in Southeast Asia, which also comprise the Southeast Asian Network for Agroforestry Education (SEANAFE). These include the Indonesia Network for Agroforestry Education (INAFE), Lao Network for Agroforestry Education (LaoNAFE), Malaysia Network for Agroforestry Education (MANAFE), Philippine Agroforestry Education and Research Network (PAFERN), Thailand Network for Agroforestry Education (ThaiNAFE) and Vietnam Network for Agroforestry Education (VNAFE). The national network coordinators or chairs of each of the six networks served as the collaborators or team members of this project. Through this project, these SEANAFE member-countries were able to sustain the regional network's initiatives of sharing knowledge and information on agroforestry education, research and development.

2.0 Methodology

The national coordinators of the six SEANAFE country-networks served as the project collaborators. The project collaborators agreed on the institutional arrangements to be able to carry out the project components more efficiently.

a) *National Training on Climate Change Adaptation Strategies*. The project leader based in the Philippines initially developed the training design, highlighting the modules that could possibly be included in the national training. This training design was sent to each of the six project collaborators for their comments, concurrence and/or modifications depending on the prevailing conditions in their respective countries. Generally, the six collaborating countries followed the training design that was initially developed by the project team leader, with some modifications. The country-specific training designs are discussed under the section on Results and Discussion. Meanwhile, the project team also devised a mechanism for selecting the training participants that would be supported by the respective collaborating countries. These criteria include: a) a faculty member or researcher of an academic institution that is a member of the national agroforestry education network, and a local extension worker/technician of the local government units; b) currently engaged in agroforestry education, research or extension activities of the nominating institution; c) with relevant work and training experiences in agroforestry and related fields; and, d) willingness of the nominating institution to provide counterpart in the form of transportation and travel allowance of their nominees.

b) *Policy Dialogue on Agroforestry*. Three countries were selected to organize the policy dialogue based on the status of agroforestry development activities. These include the Philippines, Vietnam and Lao PDR. Each of the three project collaborators convened the different agroforestry stakeholders (e.g. policy makers, lecturers, researchers and extension workers, representatives from the national government agencies/ministries such as the Department/Ministry of Agriculture, Department/Ministry of Environment, Department of Agrarian Reform, private industries and non-goverment organizations. A one-day roundtable discussion/workshop enabled the project collaborators to present the current state of agroforestry adoption and promotion in their respective countries; discuss the facilitating and constraining factors as well as opportunities in promoting agroforestry; and craft a plan of action that would pave the way for the institutionalization of agroforestry as a development strategy. The participants also deliberated on the different issues and concerns confronting the agroforestry promotion and institutionalization efforts; and the possible solutions or alternatives to be able to move forward or advance the state of agroforestry promotion.

c) *Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers.* Because of limited budget only four collaborating countries implemented this research. These include Indonesia, Thailand, Malaysia and the Philippines. While these collaborators have only a research budget of US$2000 each, they were able to select the respondents that more or less represent the different climatic areas or geographic location in their respective countries. A data gathering tool was devised by the project team leader. The guide questions focused on the perceptions and observations of the farmers about the indications of climate change, the observed effects on their agricultural/agroforestry production, their adaptation strategies, and The data were gathered using interview, focus group discussion and actual observation of the farms.

d) *Project monitoring* was done by the project team leader or a representative of PAFERN to help the project collaborators devise plans and strategies in carrying out the project activities. Project monitoring was made by actual visits to the collaborating countries, including regular follow-ups via email.

3.0 Results & Discussion

a) **National Training on Climate Change Adaptation Strategies**. A total of 129 junior lecturers and agricultural extension workers were trained in the six collaborating countries. The details are as follows:

The national training that was organized by the ***Vietnam Network on Agroforestry Education (VNAFE)*** on December 8-9, 2011 aimed to explain the concepts of global climate change (GCE) and effects of GCE to agriculture and forestry sectors; define potential solutions for climate change mitigation and adaptation via agroforestry promotion; and, assess land use change with emission of greenhouse gases and the potentials of agroforestry in reducing these emissions. The major outputs of the training are the list of climate change impacts in the agriculture and forestry sector as observed by the participants in their respective fields, and the corresponding measures to mitigate and/or adapt to climate change. Among the impacts of climate change that were identified by the participants include high incidence of forest fire, high incidence of pests and diseases, soil degradation and soil erosion, drought, flooding, declining areas for agricultural production, and limited livelihood opportunities for the farming communities. The measures that were identified by the participants to help mitigate climate change are plantation establishment and enrichment/reforestation; agroforestry; crop diversification; and, forest protection and development. This National training was attended by 22 participants comprised of the junior lecturers of the universities, staff of agriculture extension centers, researchers of science and technology institute of forestry and agriculture, and staff of forestry department.

Meanwhile, the ***Indonesia Network for Agroforestry Education (INAFE)*** held its national training on December 12-15, 2011 at the SEAMEO-BIOTROP in Bogor, Indonesia, with 17 participants coming from the member-institutions of INAFE. The modules that were tackled in this training are: Basic Concepts and Issues of Climate Change; Impacts of Climate Change to the Agriculture Sector; Soil and Water Conservation and Management; Basic Concepts of Agroforestry and its Potentials in Climate Change Mitigation and Adaptation; Climate Change Mitigation and Adaptation Strategies: Lessons from the Research Sector; Sustainable Agriculture; Policy and Regulations on Agroforestry and Climate Change: Status and Development; and, Socioeconomic Aspects of Climate Change Mitigation and Adaptation. The major output of the national training is action plans prepared by seven groups. These action plans revolve around measures for climate change mitigation and adaptation. These include: a) The Role of Social Capital in the Agroforestry Systems to Climate Change Adaptation; b) National Seminar on Climate Change

Mitigation and Adaptation through Integrated Farming Systems/Agroforestry; c) Programmed Counseling on Agroforestry and Climate Change; d) Seminar on the Role of Agroforestry in Mitigation and Adaptation to Climate Change; e) Agroforestry As An Effort of Climate Change Adaptation and Mitigation in Small Islands; f) Identification of Agroforestry Distribution in the Upstream of Wampu River Basin in Climate Change Mitigation; g) Development of Agroforestry for the Improvement of Land Productivity.

The ***Lao Network for Agroforestry Education (LaoNAFE)*** trained 16 participants on January 9-10, 2012 at the Faculty of Forestry, National University of Laos. The training course provided an opportunity for the junior researchers and extension workers to become familiar with climate change and its effects; learn the existing agroforestry models in mitigating and adapting to the impacts of climate change, carbon sequestration and carbon marketing; and, learn the survey method in estimating carbon stocks and field practices. As a culminating activity, the participants were required to present individually what they have learned from these training exercises.

The ***Philippine Agroforestry Education and Research Network (PAFERN)*** implemented the National Training of Trainors on Climate Change Adaptation Strategies for Upland Communities in the Philippines on March 13-16, 2012 at the SEAMEO-SEARCA Residence Hotel, University of the Philippines Los Banos, College, Laguna, with 34 participants composed of 15 junior agroforestry lecturers from state colleges and universities, and nine (9) agricultural officers and environment officers from the local government units. The three-day training dwelled on the following modules: Basic Concepts and Issues of Climate Change; Impacts of Climate Change to the Agriculture Sector; Exploring Ways for Climate Change Mitigation and Adaptation: Experience of the Research Sector; Potentials of Organic Farming in Climate Change Mitigation and Adaptation; Integrated Pest Management and its Potentials in Climate Change Mitigation and Adaptation; Soil and Water Conservation Management in Upland Areas; Concepts of Agroforestry and its Potentials in Climate Change Mitigation and Adaptation. The major output of the training is action plans of 21 institutions represented in the training. These action plans are geared towards addressing the climate change impacts in the agriculture sector, particularly in the upland farming communities. The action plans revolved around building/strengthening the adaptive capacities of the upland farmers; communicating and building awareness about climate change, its impacts and the potential adaptation strategies; and, agroforestry development and promotion as a climate change adaptation strategy.

The ***Malaysian Network for Agroforestry Education (MANAFE)*** held its training on February 26-28, 2012 with about 15 participants. The modules that were discussed include: Basic Concepts and Issues of Climate Change; Impacts of Climate Change to the Agriculture Sector; Climate Change Mitigation and Adaptation: Lessons and Experience of the Research Sector; Soil and Water Conservation and Management; Potentials of Integrated Pest Management on Climate Change Mitigation and Adaptation; Basic Concepts of Agroforestry and Its Potentials in Climate Change Mitigation and Adaptation.

Lastly, the ***Thailand Network for Agroforestry Education (ThaiNAFE)*** conducted its national training on April 3-5, 2012 at the Agroforestry Research and Experimental Station of Kasetsart University in Trat Province, Thailand. The training was attended by 20 participants represented by the junior lecturers from ThaiNAFE member-institutions and the agricultural extension workers. The three-day training dealt with the following modules: Agroforestry Land Use Planning for Climate Change Adaptation; Evaluation of Carbon Storage in Agroforestry Systems; Evaluation of Agroforestry Valuation for Financial Supporting; Agroforestry Network Strengthening; and, Potentials of Rubber-based Agroforestry in Climate Change Adaptation. The

participants also had a chance to visit the Agroforestry Experimental Station of the Kasetsart University. The participants were also grouped to discuss the problems and directions for agroforestry development in response to climate change. The outputs are the status and plan of action for agroforestry development in Thailand.

b) Policy Dialogue on Agroforestry

PAFERN organized a Policy Dialogue on Agroforestry on September 22, 2011 with 22 participants representing the state colleges and universities offering agroforestry education programs, local government units, national government agencies (e.g. Department of Environment and Natural Resources, Department of Agriculture, and the Department of Agrarian Reform), non-government organizations, retired professors, and legislative bodies (House of Representatives). A paper entitled "State of Agroforestry Promotion in the Philippines" was presented by the Director of the Institute of Agroforestry, the research and extension arm of the University of the Philippines Los Banos, in the field of agroforestry. The presentation highlighted the issues and gaps in agroforestry promotion. These include: a) little recognition from the policy-making bodies and other national government agencies and even individuals about the uniqueness of agroforestry from the fields of agriculture and forestry; b) no clear delineation of agroforestry areas; c) conflicting and overlapping policies in natural resources management; d) forestry policies embracing agroforestry as a concept provides some disincentives on the part of the smallholder farmers; e) no specific guidelines in undertaking agroforestry development; f) dearth of literature and researches that dwell on the economic potentials and feasibility of agroforestry development; and, g) limited initiatives on "communicating" the agroforestry research and development outcomes to the policy making bodies.

The major output of the dialogue is a draft Executive Order which calls for the Institutionalization of Agroforestry as a Development Strategy in the Philippines. The draft Executive Order was presented during the 5th National Agroforestry Congress held on November 18-20, 2011 in Pampanga, Philippines. The next move of the agroforestry advocates is to work closely with the different national government agencies (e.g. Department of Agriculture, Department of Environment and Natural Resources, and the Department of Agrarian Reform) in lobbying this policy initiative to the Office of the Philippine President. A copy of the draft Executive Order is presented in Appendix 3.

LaoNAFE held its Policy Dialogue on November 29, 2011 at the National University of Laos and was attended by 22 participants coming from the Department of Forestry; National Agriculture and Forestry Extension Service Center; National Agriculture and Forestry Research Center under the Ministry of Agriculture; and, the Forestry and Environmental Division under the Ministry of Energy and Mines. The dialogue served as a venue to discuss the roles of agroforestry in environmental protection; deliberate on the issues that are being faced by the different stakeholders such as the policy and decision makers; the researchers and extensionists; and the traders and local villagers.

VNAFE organized its Policy Dialogue on December 9, 2011 which was participated by the 22 participants of the National Training on Climate Change Adaptation Strategies, and seven guests representing the leaders of the province, agriculture-forestry companies, agriculture and forestry departments, and provincial extension centers. A paper presentation was made about climate change and its effects on agriculture and forestry, and the potentials of agroforestry in addressing these effects. During the deliberation, the participants were guided by the following questions: a) Why is agroforestry not being adopted in the sloping areas, and instead, monoculture is still very rampant? b) Is there any policy that would support the farmers to

practice agroforestry? c) Considering the potentials of agroforestry in climate change mitigation and adaptation, what would be the institutional and policy requirements for its promotion and institutionalization?, and d) How should the value of environmental services of agroforestry be recognized?

Among the factors that constrain the adoption of agroforestry technologies are land tenure, inefficient land use planning, lack of technology information, marketing of products, farmers are not aware about the impacts of climate change on their livelihoods, lack of government policies to implement programs that are geared towards agroforestry adoption, lack of resources, most of the sloping areas are being managed by businessmen, whose primary goal is to achieve crop production on a particular commodity, limited information dissemination about the good agroforestry models; the government policy of converting forest resources to rubber plantation promoted monoculture.

With these concerns, the participants recommended to work towards the development a policy for rewarding or paying the poor upland farmers for the environmental services that they provide; draft a policy on landscape approach in agroforestry development; integrate agroforestry in the implementation of Payment for Environmental Services (PES) and REDD; and, conduct a comparative analysis on the economic on the economics of Agroforestry and Monoculture.

c) Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers

In the Philippines, PAFERN conducted the research in the three major islands of the country, particularly in Bansalan, Davao del Sur (with Type IV climate in Mindanao); Atok and Tublay, Benguet (with Type 1 climate in Northern Luzon); Ligao, Albay (with Type II climate in Southern Luzon) and Tabango, Leyte (with Type IV climate in Eastern Visayas). A total of 56 respondents were covered in the Philippines.

Results indicate that the upland farmers have already been experiencing climate change. All of them have mentioned that the climate that used to prevail in their respective areas have change a lot. They recalled that in the past, they could really time their agricultural production because of the normal rainfall patterns. But in the recent years, particularly during the onset of year 2000, they have already observed the changing patterns. They have observed that the heat is more intense now, especially in Southern Luzon and there were more rainy days now, and rain was heavier especially in year 2010 and 2011 (Figure 1). The Mindanao area and Eastern Visayas, both having Type IV climate should have even distribution of rains throughout the year. However, the farmers perceived that the rainy season was very much extended, such that, there were still heavy rains during the summer season. This was also the claim of the farmers in Northern and Southern Luzon.

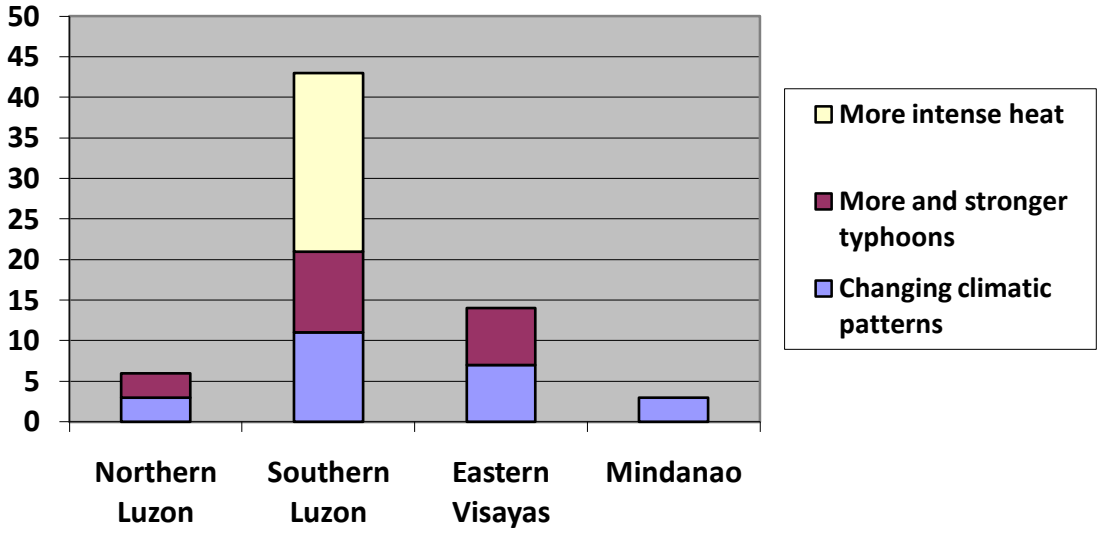

Figure 1. Indications of climate change as observed by the respondent-farmers in the Philippines.

Consequently, these climatic changes have affected the agricultural production of the respondent-farmers, simply because agriculture is influenced largely by rainfall and temperature. Figure 2 highlights that generally, there has been a decline in the crop production of the respondent-farmers. This has been brought about by the low crop yield, which was caused by the higher incidence of pests and diseases, delayed fruiting of crops, stunted growth or vegetative growth is encouraged because of too much rain, particularly in the case of corn, higher incidence of weeds because of the continuous rains, and the increase in the labor costs. Other observed effects of climate change among the farmers in Southern Luzon are the pest infestation at the onset of the first rain after a long drought. This occurred in 2010 when black bug and army worm infestation was experienced in rice production.

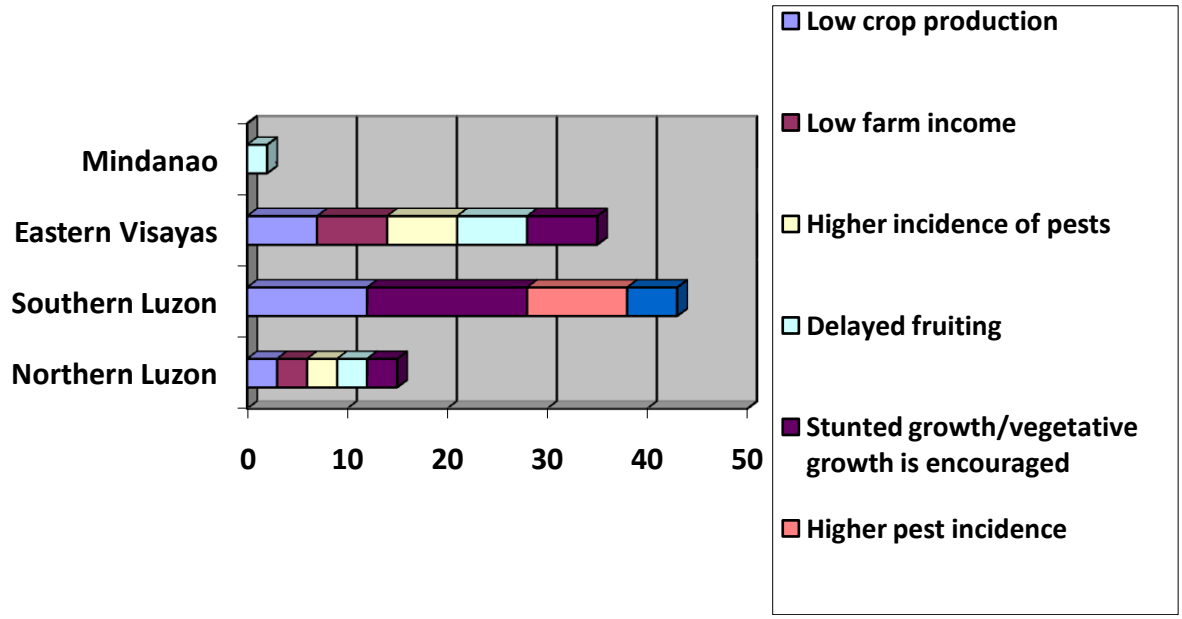

Figure 2. Observed effects of climate change to the agricultural production of respondent-farmers in the Philippines

The results also revealed that the farmers make use of their local knowledge in addressing the effects of climate change to their agricultural production. Most of them have mentioned changing their crops that would suit the changing rainfall patterns, integrating more crops to maximize the production, and a few practice their rituals to prevent their crops from being attacked by the pests, while most of the respondents would not just plant the crops, and instead engaged themselves in some off-farm and /or non-farm activities (Figure 3).

The results also suggest that there were no information dissemination or communications from the local development organizations about climate change and the possible climate change adaptation strategies that could be employed by the farmers in addressing the impacts of climate change. It is apparent, therefore, that even the local government organizations, should be equipped with the knowledge and skills in climate change and climate change mitigation and adaptation strategies, so these could be transferred to the upland farmers within their areas. The technical assistance mentioned for Southern Luzon is the control of black bug when there was an infestation in 2010. The LGU-Department of Agriculture told the farmers to trap the black bug by using light.

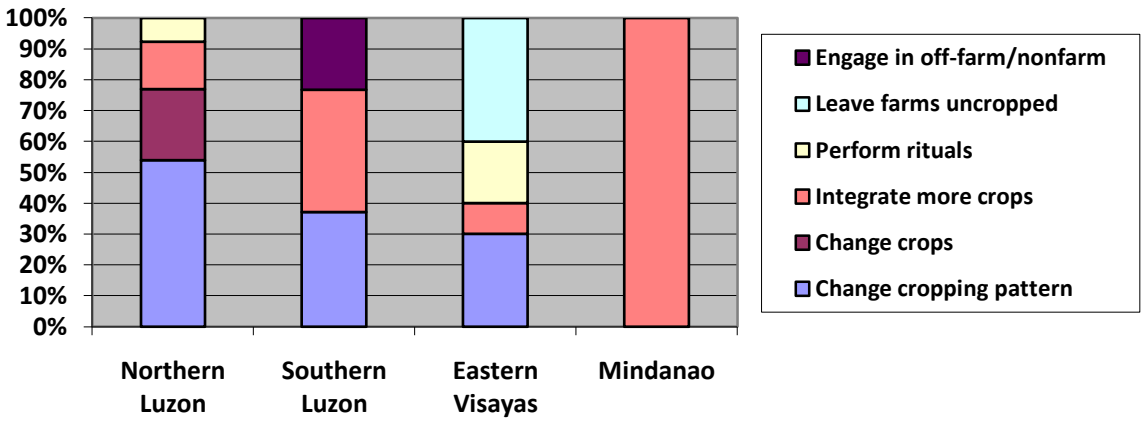

Figure 3. Climate change adaptation strategies of respondent-farmers in the Philippines.

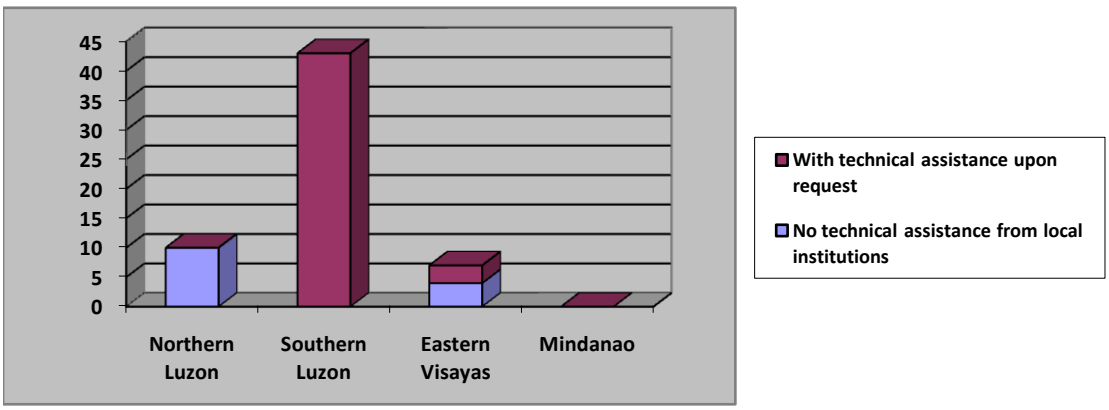

Figure 4. Technical assistance received by the respondent-farmers from local development institutions

In Indonesia, on the other hand, 79% of the respondents considered climate change as the change of weather, particularly the temperature. This is because they have observed that the weather in their areas was hotter compared in the past. In the past, they were already aware about the rainy and summer season. About 48% of the respondents attributed the climate change because of deforestation as a result of illegal logging while 40% believed that climate change was brought about by environmental degradation (Figure 5).

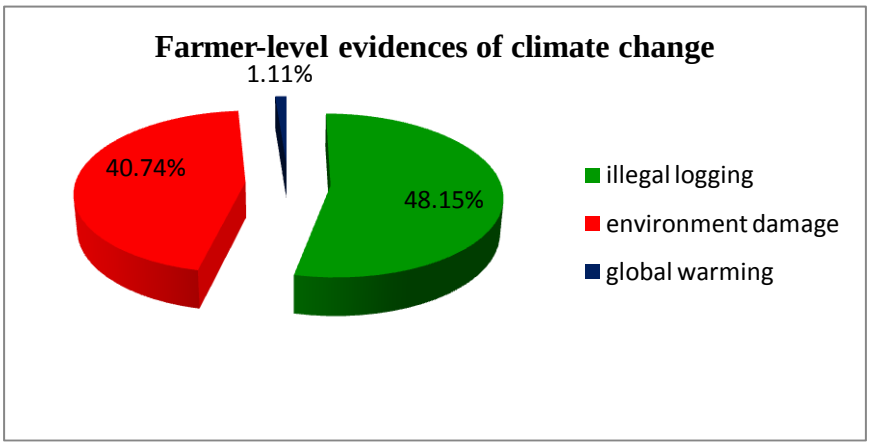

Figure 5. Climate change as perceived by the respondent-farmers in Indonesia

As a consequence of the hotter temperature, the river system or water sources in some areas in Indonesia dry up. On the other hand, when the rainy season comes, it oftentimes bring flood even with just a small volume of rainwater. Similar conditions are also being experienced by the communities living along the upstream of Kapuas River Basin. Based on his research, Boer et al. (2010) stated that climate change will provide a significant impact on agricultural production in Indonesia, especially food crops. The impacts could be direct impact, which is decreasing productivity due to increased air temperature and rainfall patterns and more frequent of crop failures due to increased frequency of extreme climate events such as floods and droughts.

As shown in Figure 6, the effects of climate change in the agricultural crop production include the delays in the harvesting of crops (82%), decline in crop yield (77%), the declining quality of the produce (66%); and, the increase in the incidence of pests and diseases (51%)

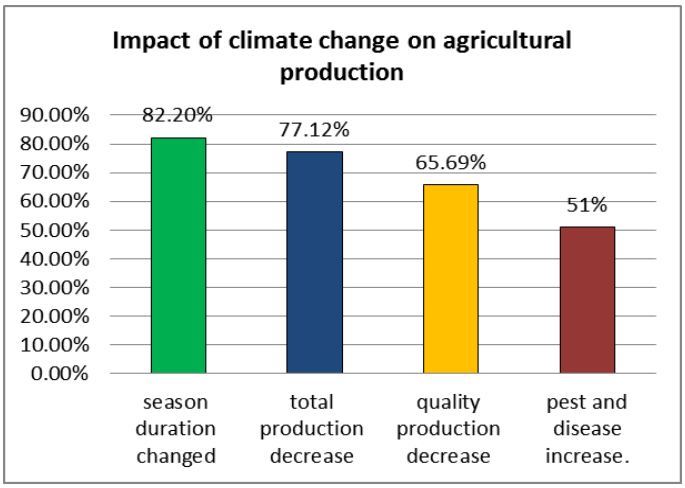

Figure 6. Impact of climate change in the agricultural production of farmer-respondents in Indonesia.

Among the climate change adaptation strategies being employed by the farmer-respondents are rejuvenation of trees, enrichment of crop species using their local knowledge, referrring to some textbooks, or radio broadcasts. These two strategies, according to 70% of the respondents were effective in terms of addressing the impact of climate change on fruit crops, crop yield, water management and soil conditions. However, these did not address the problem on the higher incidence of pests and diseases. About 74% of the respondents believed that agroforestry could be a best alternative land use management system that could address the impacts of climate change.

As regards the technical support or assistance from local institutions, 89% of the farmer-respondents mentioned that there was no assistance nor programs initiated by these institutions to mitigate or adapt to the impacts of climate change, particularly among the farming communities. Meanwhile, 11% of the respondents mentioned that the Forestry Sub-department had provided them with information about climate change, but none on the mitigation and adaptation strategies. Thus, the farmers believed that proper information dissemination and strengthening of the community organizations are necessary to be able to enhance their capacities to adapt to the impacts of climate change (Figure 7).

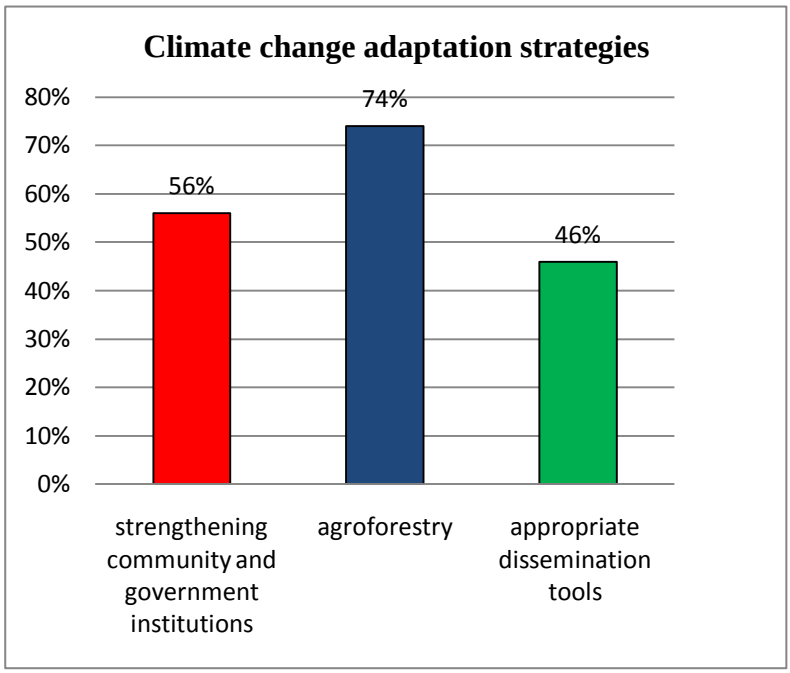

Figure 7. Strategies that could help enhance the capacities to adapt to the impacts of climate change, as perceived by the farmer-respondents

Conclusions

The project aimed to conduct six national training on climate change adaptation strategies; organize policy dialogue to deliberate on the issues and concerns confronting the institutionalization of agroforestry; and find out the climate change adaptation strategies of the upland farmers. The results and outcome of this project indicated indeed climate change is a very serious and critical worldwide phenomenon as indicated by the increasing interest from the academic institutions and local governments to get training on climate change adaptation strategies. This is because of the fact that the six collaborating countries are all agricultural countries, and therefore, the impacts of climate change to the agriculture sector have been clearly seen by the stakeholders. This project also revealed that while a number of initiatives have been undertaken in the area of agroforestry education, research and extension, its wide promotion and adoption at the grassroots level and is hampered by a number of factors such as institutional support system, land tenure arrangements, technical know-how, policies, financial and farmers' preferences. Finally, this project concludes that climate change is already being experienced by the upland farmers, and its effects are already observable such as the higher incidence of pests and diseases, low crop productivity/yield, low farm income, delays in fruiting and harvesting. Results also point out the need to capacitate the local institutions so that they could effectively communicate or disseminate information about the different climate change adaptation strategies that are appropriate in the farming communities within their respective areas; and, strengthen the local knowledge of the upland farmers in adapting to the impacts of climate change.

5.0 Future Directions

The results of the "Documentation of Climate Change Adaptation Strategies of Selected Upland Farmers in Southeast Asia" indicate that the local farmers have limited options in adapting to the impacts of climate change. While most of the respondents are already aware about climate change, they lack the technical assistance from the local development organizations regarding the different climate change adaptation strategies. While they make full use of their local knowledge, it would also be better if these are complemented with other alternatives/options to be able to maximize their agricultural production. Therefore, the project collaborators recognize the need to build the technical capabilities of the local/upland farmers to enhance their capacities to adapt to the impacts of climate change, including strategies that could help them develop and/or improve their farming systems to become more resilient to climate change impacts and other external shocks. In addition, the institutional action plans that were formulated by the training participants could best be monitored if these are being implemented by the participants. These action plans were all geared towards enhancing the capacities of either their own institutions or their partner farming communities to adapt to the impacts of climate change. There were 21 institutional action plans in the Philippines, and seven major action plans in Indonesia.

References

Follow a standard format when citing your references

Appendix 1. Training Design of the National Training on Climate Change Adaptation Strategies

Background/Rationale

There is no way out to climate change. This natural and human-induced phenomenon is indeed being experienced worldwide, and the way to cope with it is to enhance the adaptation mechanisms of the agriculture sector, especially the farmers.

Southeast Asia is generally an agricultural region, and most of the human populace is engaged in farming. The small-scale farmers are definitely more vulnerable to the climate change that is currently being experienced in the country. These small-scale farmers are vulnerable in the sense that they have limited access to crop forecasting, basic agricultural services, and more importantly capital. These limitations would definitely contribute to the declining farm productivity. Given these, the agricultural technicians of the different local government units should be equipped with the knowledge and skills in educating these small farmers about the issue on climate change, and how farmers could mitigate and adapt to this global problem.

In line with this, the Philippine Agroforestry Education and Research Network (PAFERN), in collaboration with the member-countries of the Southeast Asian Network for Agroforestry Education (SEANAFE) namely: Indonesia (INAFE), Thailand (ThaiNAFE), Lao PDR (NaoNAFE), Vietnam (VNAFE), and Malaysia (MANAFE) will be organizing a National Training of Junior Scientists and Local Extension Workers. As one of the project components of the APN-funded project "Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through Local Capacity and Policy Development in Southeast Asia", this training course intends to convene the junior lecturers of different country network members, and the selected staff of the local government units that are providing technical and extension services to the upland farmers.

Objectives

The general objective of this training course is to equip the junior lecturers and agricultural technicians from the local government units, with the knowledge, skills and attitude in climate change mitigation and adaptation strategies for possible dissemination among the farming communities within their respective areas.

At the end of the training course, the training participants are expected to:

1. Share the recent climatic changes in their respective areas based on the current state of agricultural production
2. Explain the concepts, issues and impacts of climate change to the agricultural sector;
3. Assess the suitability of different climate change mitigation and adaptation strategies in their respective areas
4. Prepare an action plan that is geared towards promoting appropriate climate change mitigation and adaptation strategies among the farming communities

Methodology

Lecture-discussion and experiential learning approach shall be employed in this training course to encourage effective transfer of learning, and direct application of learning and experiences to achieve the training objectives.

Training Modules

Module 1. Understanding Climate Change

This module aims to level off the understanding of the participants about climate change. It shall provide the basic concepts of climate change, with emphasis on its impacts to the agriculture/farming sector. In addition, the participants will also be encouraged to share their actual experiences or observations about the changing climatic conditions in their respective areas based on the current state of agricultural production. This module will be undertaken through a lecture-discussion and sharing of experiences/reporting.

Topics	Number of Hours	Methodology
Leveling-Off Understanding About Climate Change	0.5 hour	Using metacards
Basic Concepts and Issues of Climate Change	2.0 hours	Lecture-discussion Sharing of experiences
Impacts of Climate Change to the Agriculture Sector	2.0 hours	Lecture-discussion Sharing of experiences
TOTAL	**4.5 hours**	

Module 2. Climate Change Mitigation and Adaptation Strategies

This module will dwell on the different agricultural practices and land use management systems that could be an option among the farming communities to adapt to climate change in their respective areas. These agricultural practices may include the: soil and water conservation and management; integrated pest management; organic farming/agriculture; water use efficiency; and, agroforestry.

Topic	Number of Hours	Methodology
Climate Change Mitigation and Adaptation Strategies: Lessons and Experiences from Research Sector	2.0 hours	Lecture-discussion Sharing of experiences
Organic Farming/Agriculture (e.g. use of organic fertilizers, use of farm wastes for compost, etc)	4.0 hours	Lecture-discussion Sharing of experiences Hands-on experiences/field trip
Integrated Pest Management	4.0 hours	Lecture-discussion, Sharing of experiences, Actual application/Hands-on

Basic Concepts and Principles of Agroforestry and its Potentials in Climate Change Adaptation	2.0 hours	Lecture-discussion Sharing of experiences
Soil and Water Conservation and Management	4.0 hours	Lecture-discussion Sharing of experiences Hands-on experiences/field trip
TOTAL	**16 hours**	

Module 3. Creating Awareness About Climate Change and the Adaptation Strategies

Based on the learnings from previous modules, each participant will develop his/her indicative action plan that is geared towards creating awareness about climate change and the climate change mitigation and adaptation strategies, among the farming communities within his/her respective area of assignment. The action plan will be made following a suggested format and should be integrated in the annual municipal or provincial development plan of the local government unit.

Activity	Time/Duration	Methodology
Action Planning	3.0 hours	Individual work with guidance from the training team
Presentation of action plans	2.0 hours	Plenary presentation
TOTAL	**5 hours**	

Target Participants

The target participants of this training course are the junior lecturers and extension workers from the local government units.

Selection of participants

1. The project collaborators (national network coordinators) should take the lead in the selection of 20 training participants
2. The training participants should represent the ***junior lecturers in agroforestry/forestry/agriculture from the different member-institutions of a particular national network***, and the ***extension workers or technicians employed at the local governments***
3. As indicated in our earlier emails, there is a very limited fund support for this National Training (US$2700), and therefore, when we were still finalizing the proposal, we have sought your

concurrence to source out funds from other potential funding institutions at the local level to be able to implement this national training. Should there be no other sources of training funds, the project team may only provide partial training fund support to the participants. (e,.g. the training participants may shoulder their transportation/travel expenses and the project team could just take care of the food and accommodation and other expenses, etc)

4. Therefore, the project team may use the following criteria in the selection of training participants:. The team may also come up with additional set of selection criteria (other than those mentioned below) whenever necessary.
   a) Employed in an academic institution that is a member of a national country network on agroforestry education (in the case of junior scientists), and in a local government unit (in the case of local extension workers/technicians)
   b) Currently engaged in agroforestry education, research or extension activities of the nominating institution
   c) Relevant work and training experiences in agroforestry and related fields
   d) Willingness of the nominating institution to provide counterpart (in any form that may be decided upon by the project team, such as shouldering the travel allowance/expenses, etc)

Appendix 2a. National Training on Climate Change Adaptation Strategies in Indonesia

Date: December 12-15, 2011
Venue: SEAMEO-BIOTROP, Bogor, Indonesia

Program

Schedule	Program/Activity	Resource Person
December 13, 2011		
8:30 – 9:30	Opening Ceremonies	Dr. Bambang Purwantara, SEAMEO-BIOTROP Director
		Prof. Sugeng P. Harianto Institut Pertanian Bogor
9:30 – 10:00	Levelling-off Expectations	Dr. Christine Wulandari, INAFE Chair/Project Collaborator
10:00 – 12:00	Basic Concepts and Issues of Climate Change	Dr. Meine van Noordwijk ICRAF-Indonesia
1300 - 1500	Impacts of Climate Change to the Agriculture Sector	Prof. KurniatunHairiah University of Brawijaya
1515 - 1715	Soil and Water Conservation and Management	Dr. FahmudinAgus/
1930 - 2130	Basic Concepts and Principles of Agroforestry and its Potentials in Climate Change Adaptation	Dr. Budiadi Gadjah Mada University
December 14, 2011		
800 – 1000	Climate Change Mitigation and Adaptation Strategies: Lessons and Experiences from Research Sector	Dr. Niken Sakuntaladewi FORDA
1000 - 1100	Sharing experiences of AF practices	Prof. Sambas/ GadjahMada University
1100 - 1300	Sustainable Farming/Agriculture (e.g. integrated pest management, use of organic fertilizers, use of farm wastes for compost, etc	Dr. Dami Buchori/ IPB
1400 - 1600	Policy and Regulation on Agroforestry and Climate Change: Status and Development	Dr. Christine Wulandari Lampung University
1600 - 1800	Socio-economic Aspects on Climate Change Mitigation and Adaptation Strategies	Dr. Mahrus Aryadi UNLAM
1900 - 2100	Action Planning	Prof. Riyanto/ Unmul&RommyQurniaty, S.P., M.Si

Participants

Appendix 2b. National Training on Climate Change Adaptation Strategies in Vietnam

Date: December 8, 2011
Venue: Tay Nguyen University

Program

Schedule	Program of Activities	Methodology
December 8, 2011 Morning Session	Climate Change Concepts	Presentation Phillip 5/9/4
	Climate Change Mitigation and Adaptation	
	Effects of Climate Change to Agriculture and Forestry	
Afternoon Session	Solutions in Climate Change Mitigation and Adaptation in Agriculture and Foresttry	Presentation Brainstorming
December 9, 2011 Morning Session	Reducing Emissions through Agroforestry	Presentation Practice on computer and ArcGIS about Land use/land cover mapped from SPOT 5
	Application of GIS in Monitoring Land Use Change and Co_2 Emission	
	Agroforestry as a Solution to Reduce Co_2 Emission	
	Climate Change Adaptation through Agroforestry	Presentation General discussion

Participants

Name	Position	Agency
Lê Công Trường	Deputy of Forest Department	Forest Department of Daknong Province
Triệu Thị Lắng	Lecturer	Tay Nguyen University
Trần Thị Xuân Phấn	Lecturer	Tay Nguyen University
Hoàng Thị Trà Mi	Staff	Extension Center of Buon Ma Thuot City
Đinh Thị Hiệp	Staff	Extension Center of Gia Lai Province
Nguyễn Tấn Vinh	Staff	Extension Center of Daklak Province
Cao Thị Hoài	Lecturer	Tay Nguyen University
Phan Thị Hằng	Lecturer	Tay Nguyen University
Hoàng Trọng Khanh	Lecturer	Tay Nguyen University
Hồ Tiến Cương	Head of Science and Technology	Extension Center of DakNong Province
Hồ Đình Bảo	Lecturer	Tay Nguyen University

Name	**Position**	**Agency**
Hồ Công Vũ	Head of silvicultural department	Forestry Department of Kontum Province
Huỳnh Cao Thoại	Staff	Forestry Department of Gia Lai Province
Lê Thị Ánh Tuyết	Staff	Forestry Department of Daklak Province
Nguyễn Thị Tình	Lecturer	Tay Nguyen University
Hoàng Thị Ái Duyên	Reseacher	Tay Nguyen Science and Technology Institute of Forestry and Agriculture
Hoàng Hải Long	Reseacher	Tay Nguyen Science and Technology
Nguyễn Thị Phương Uyên	Staff	Forestry Department of Daklak Province
Phạm Đoàn Phú Quốc	Lecturer	Tay Nguyen University
Lê Đăng Pha	Staff	Department of Science and Technology of Daklak
Phạm Ngọc Tuân	Lecturer	Da Lat University
Nguyễn Thị Ngọc Quyên	Lecturer	Tay Nguyen University

Appendix 2c. National Training on Climate Change Adaptation Strategies in the Philippines

Date: March 13-16, 2012
Venue: SEARCA Residence Hotel, UPLB, College, Laguna

Program

Schedule	Program of Activities	Resource Person
March 13,2012	ARRIVAL OF PARTICIPANTS	
March 14, 2012		
8:30 – 9:30 AM	Opening Ceremonies	Director and Staff of the UPLB Institute of Agroforestry
9:30 – 10:00	Levelling-off expectations	Ms. Leila D. Landicho Institute of Agroforestry
10:00 – 12:00	Basic Concepts and Issues of Climate Change	For. Marlea P. Munez President, Women Initiatives for Society and Environment
1:30 – 3:30 PM	Impacts of Climate Change to Agriculture Sector	Dr. Felino P. Lansigan Professor, Statistics UPLB
3:30 – 5:30	Workshop to assess observed indications and impacts of climate change in the participants' areas	Ms. Leila D. Landicho
5:30 – 7:00	Exploring Ways for Climate Change Mitigation and Adaptation: Experience of the Research Sector	Dr. Ma. Victoria Espaldon Professor, Environmental Science and Management, UPLB
March 15, 2012		
8:00 – 10;00	Potentials of Organic Farming in Climate Change Mitigation and Adaptation	Dr. Teodoro C. Mendoza Professor, Crop Science Cluster, UPLB
10:00- 12:00	Integrated Pest Management and Its Potentials as a Climate Change Adaptation Strategy	Dr. Merdelyne C. Lit University Researcher, Institute of Plant Breeding, UPLB
1:30 – 3:30	Soil and Water Conservation and Management for Upland Areas	Dr. Victor B. Ella Professor, Land and Water Resources, UPLB
3:30 – 5:30	Agroforestry and Its Potentials as a Climate Change Mitigation and Adaptation	Dr. Roselyn F. Paelmo University Researcher, Institute of Agroforestry, UPLB
5:30 – 6:30	Briefing for action planning	
March 16, 2012		
6:00 – 8:00	Field Visit to an Organic Farm	
8:00 – 10:00	Preparation of action plans	Participants
10:00 AM – 2:00 PM	Presentation of Action Plans	Participants

Participants

Participants	Designation	Institution
Emerson V. Barcellano	Professor, Department of Forestry	Kalinga State College Tabuk, Kalinga
Eric C. Bimmoy	Instructor, Department of Agroforestry	Ifugao State University Lamut, Ifugao
Arlene Lucas C. Millare	Instructor, Department of Forestry	Abra State Institute of Science and Technology Lagangilang, Abra
Lilito D. Gavina	Professor, Department of Agroforestry	Don Mariano Marcos Memorial State University Bacnotan, La Union
Maricon R. Perez	Instructor, Department of Forestry	Isabela State University Cabagan, Isabela
Darwin Totaan	Instructor, Department of Agroforestry and Forestry	Pampanga Agricultural College Magalang, Pampanga
Pricillo Barrameda	Instructor, Department of Agroforestry	Mindoro State College of Agriculture and Forestry Victoria, Oriental Mindoro
Gerald Zaragosa	Instructor, Department of Agroforestry	Western Visayas College of Science and Technology Leon,Iloilo
Jerry C. Esperanza	Instructor, Institute of Agriculture and Forestry	University of Rizal System Tanay, Rizal
Riezl Jose	Researcher	Bohol Island State University Tagbilaran City
Samuel Bernaldez	Instructor, Department of Agroforestry	Visayas State University Baybay, Leyte
Rodel Pasion	Instructor, Department of Agroforestry	Caraga State University Butuan City
Rodriga Aguinsata	Instructor, Department of Forestry	Central Mindanao University Musuan, Bukidnon
Jeremias B. Acero	Instructor, Department of Agroforestry	Surigao del Sur State College of Technology
Melvin Disomimba	Instructor, Department of Forestry	Mindanao State University Marawi City
Mario P. Abana	Chief, Forest Management Section	Provincial Environment and Natural Resources Office Tuguegarao City
Patricia D. Abibico	Municipal Environment and Natural Resources Officer	LGU-Tabuk Kalinga
Erwin M. Adornado	Administrative Assistant	LGU-Sto. Tomas, Batangas
Freddie E. Adop	CDRRM Officer	LGU-Tabuk, Kalinga
Jemuel V. Calinawan	Agricultural Technologist	LGU-Sto. Tomas, Batangas
Oseas I. Diasen	Sangguniang Bayan Member	LGU-Candon City, Ilocos Sur
Victoria L. Duguran	Administrative Officer	LGU-Sto. Tomas, Batangas
Concepcion M. Duka	Agricultural Technologist	LGU-Sto. Tomas, Batangas
Fernando P. Galamgam	Agricultural Technologist	LGU-Mallig, Isabela

Participants	Designation	Institution
Mario G. Hipolito	Chief, Biodiversity Division	Provincial Environment and Natural Resources Office Tuguegarao City
Ofelia B. Malabanan	Supervising Agriculturist	LGU-Sto Tomas, Batangas
Zenaida A. Malvecino	Agricultural Technologist	LGU-Sto. Tomas, Batangas
Rizalyn Mendrano	Senior Environmental Management Specialist	LGU-San Fernando City
Annalyn C. Rosario	Environment Management Specialist	LGU- San Fernando City
Sonia Unico	Staff of MENRO	LGU-Sto Tomas, Batangas
Bernadette L. Valdez	Agricultural Technologist	LGU-San Fernando City
Eric C. Velasco	Municipal Environment and Natural Resources Officer	LGU-Sto Tomas, Batangas
Dennis T. Yamuta	Planning and Development Officer	Misamis Oriental State College of Agriculture and Technology Claveria, Misamis Oriental

Appendix 3a. Policy Dialogue in Agroforestry, Vietnam

Date: December 9, 2011
Venue: Tay Nguyen University

Participants	Designation	Institution
Phạm Tuấn Anh	Vice Chair	People's committee of Dak Mil District
Nguyễn Trương Bình	Deputy Director	Forestry company of Lak
Phạn Thế Minh	Director	Forestry company of Madrak
Lê Văn Dĩ	Director	Forestry company of EaWy
Trần Văn Khoa	Head	Protection Department
Nguyễn Tuấn Khải	Director	Extension Center of Dak Nong Province
Ngô Nhân	Deputy Director	Extension Center of Dak Lak Province

Appendix 3b. Policy Dialogue in Agroforestry in the Philippines

Date: September 22, 2011
Venue: Sulo Hotel, Quezon City

Participants

Name	Designation	Institution
Roberto G. Visco	Director	Institute of Agroforestry, University of the Philippines Los Banos
Lutgarda L. Tolentino	Chair	Philippine Agroforestry Education and Research Network
Wilfredo M. Carandang	Executive Secretary	Southeast Asian Network for Agroforestry Education
Adolfo Revilla, Jr	Former Dean	College of Forestry and Natural Resource, UPLB
Virgilio T. Villancio	University Researcher	Agricultural Systems Cluster, UPLB
Josefina T. Dizon	Director	IARDS, College of Public Affairs, UPLB
Florencia B. Pulhin	Researcher	World Agroforestry Center (ICRAF)-Philippines
Ruel Limbo	Project Officer	Department of Agrarian Reform
Nicanor Iscala, Jr.	Senior Forest Management Specialist	Department of Environment and Natural Resources
Rodolfo Galang	Senior Agriculturist	Department of Agriculture-Bureau of Agricultural Research
Honorio M. Soriano, Jr.	President	Pampanga Agricultural College
Orlando P. Almoite	President	National Agroforesters' Association of the Philippines

Name	Designation	Institution
Faustina Barradas	Senior Science Research Specialist	Forestry and Environment Research Division, PCARRD
Rizalyn Medrano	Senior Environment Management Specialist	LGU-San Fernando City
Analyn Rosario	Environment Management Specialist	LGU-San Fernando City
Calixto dela Pena	Municipal Agriculture Officer	LGU- Nagcarlan, Laguna
Zenaida Malvecino	Agricultural Technologist	LGU-Sto. Tomas, Batangas
Catherine C. de Luna	University Researcher	Institute of Agroforestry, UPLB
Rowena D. Cabahug	University Researcher	Institute of Agroforestry, UPLB
Roselyn F. Paelmo	University Researcher	Institute of Agroforestry, UPLB
Leila D. Landicho	University Researcher	Institute of Agroforestry, UPLB

Funding sources outside the APN

A list of agencies, institutions, organisations (governmental, inter-governmental and/or non-governmental), that provided any in-kind support and co-funding for the project and the amount(s) awarded. If possible, please provide an estimate amount.

1. The Southeast Asian Ministers of Education Organizations-Tropical Biology (SEAMEO-BIOTROP) which is based in Bogor, Indonesia , provided the training facilities and discounted rates on the accommodation of the training participants.
2. The Southeast Asian Ministers of Education Organizations-Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEAMEO-SEARCA) which is based at the University of the Philippines Los Banos, provided support in the use of the training facilities

Glossary of Terms

Include list of acronyms and abbreviations

INAFE	Indonesia Network for Agroforestry Education
LaoNAFE	Lao Network for Agroforestry Education
MANAFE	Malaysia Network for Agroforestry Education
PAFERN	Philippine Agroforestry Education and Research Network
ThaiNAFE	Thailand Network for Agroforestry Education
VNAFE	Vietnam Network for Agroforestry Education
LGU	Local government unit
SEANAFE	Southeast Asian Network for Agroforestry Education

PROPOSED EXECUTIVE ORDER

ESTABLISHMENT OF THE NATIONAL AGROFORESTRY DEVELOPMENT PROGRAM (NAFDP)

WHEREAS, the Philippines and other parts of the world are facing a number of challenges in agricultural production, food security, environmental degradation, poverty and the global climate change;

WHEREAS, the agriculture sector, particularly the farming communities are most vulnerable to the impacts of climate change because of the changes in the rainfall and temperature patterns that could limit food supply, alter cropping seasons, increase incidence of pests and diseases, and ultimately affect agricultural productivity**;**

WHEREAS, agroforestry is a land use management system which combines the production of agricultural crops, woody perennials and livestock and/or aquatic resources to address socioeconomic productivity of the upland farmers, and ecological stability in the watershed continuum

WHEREAS, recognizing further that the diverse components of agroforestry provide multiple harvests at different times of the year, thereby, ensuring income and reducing the risk of crop loss. Because of these benefits, agroforestry can improve the lives of the farmers, help reduce poverty, and maintain ecological stability

WHEREAS, the LGUs also play a vital role in the conservation and rehabilitation of watershed and marginal areas, and thus, their active participation in the promotion of agroforestry should be strengthened, sustained and institutionalized

WHEREAS, there is a continuing upland population pressure which means increasing demand for basic needs, and therefore the need for alternative livelihood;

WHEREAS, there is an increasing interest in pursuing agroforestry education among the educational institutions and individuals, and therefore, the placement of agroforestry graduates should be taken into consideration

WHEREAS, a critical mass of quality agroforesty practitioners is necessary to advance these systems to a scale significant for improving the quality of lives in the uplands and throughout the landscape

NOW, THEREFORE, I BENIGNO C. AQUINO III hereby promulgates this Executive Order No. which calls for the establishment of the National Agroforestry Development Program (NAFDP), on ____ day of _____,2011.

THE NAFDP OBJECTIVES

The primary goal of the NAFDP is to institutionalize agroforestry as a development strategy in the Philippines. Specifically, it aims to:

1. Institutionalize agroforestry development among the community-based forest management sites that will lead towards the operationalization of a community-managed agroforestry extension services
2. Establish a national agroforestry center that will harmonize and serve as the nucleus of all agroforestry development initiatives in the country
3. Enhance the capacity of the local development organizations that are involved in sustainable upland development endeavors
4. Promote agroforestry enterprise development
5. Intensify policy advocacy programs on various issues and concerns in agroforestry development and promotion
6. Implement responsive agroforestry research and technology development
7. Institutionalize the multisectoral partnership in all agroforestry development initiatives at all levels

SCOPE AND COVERAGE

The NAFDP shall cover the forestlands, upland areas, alienable and disposable areas where agroforestry is an appropriate intervention to address the socioeconomic needs of the farmers, and ensure environmental stability or ecological balance

INSTITUTIONAL ARRANGEMENTS

1. National Government Agencies (e.g. DENR, DA and DAR)

a) Review existing policies in sustainable development particularly the CBFM, Upland Agroforestry Program, Sustainable Upland Development Program, National Greening Program and the DA-DAR-DENR Convergence Initiatives programs to ensure that the specific guidelines and requirements for the establishment of agroforestry projects at the national, provincial, municipal and project levels are incorporated in the Implementing Rules and Regulations, and/or other equivalent guidelines
b) Initiate the conduct of national and regional discussions and on-the-ground consultations relating to the policies concerning agroforestry and sustainable upland development
c) Initiate and enhance partnership and coordination with private sector groups, donor agencies and other relevant external bodies
d) Provide assistance to the program beneficiaries in the packaging and marketing of products derived from the project areas
e) Allocate funds for the implementation of the NAFDP

2. Commission on Higher Education (CHED) and state colleges and universities

a) Safeguard the quality of formal agroforestry education programs in the country
b) Devise monitoring scheme for schools implementing BS Agroforestry
c) Assist in the coordination and implementation of the NAFDP in their areas of responsibility

d) Provide resource persons and technical experts to deliver lectures or demonstrations on topic related to agroforestry
e) Continue implementing need-driven and responsive agroforestry education programs that would be able to address the needs of the society
f) Identify strategies that would make their agroforestry education programs more attractive to the prospective students and employers
g) Conduct research about the most suited and appropriate agroforestry models in their respective locality

3. Institute of Agroforestry-University of the Philippines Los Banos and the Philippine Agroforestry Education and Research Network

a) Conduct training courses on agroforestry and related topics
b) Monitor the implementation of agroforestry programs in various local government units
c) Produce relevant information materials for advocacy programs
d) Conduct IEC about the NAFDP at all sectors and levels

4. Research and development organizations

a) Continuously work and search for viable, appropriate and sustainable agroforestry technologies, disseminate research results to all stakeholders
b) Develop synergy within and among themselves for the common purpose of improving the quality of lives of the people and maintaining ecological stability and integrity of the whole watershed continuum
c) Generate new knowledge through the conduct of research and development programs including the documentation of successful agroforestry technologies in various areas of the Philippines. These documentation of agroforestry technologies should be packaged for dissemination among the agroforestry farmers for possible replication in their areas

5. Non-government organizations

a) Proactively work with different local and international organizations for more effective and sustainable implementation of agroforestry extension for rural and enterprise development
b) Continuously serve as the bridge between the grassroots community and the government for the promotion of pro-rural/farmer development programs
c) Help empower the grassroots, and continuously work on policy advocacy and campaign for the promotion of agroforestry

6. Local government units

a) Institute local policies, measures and programs in agroforestry and implement them effectively
b) Integrate agroforestry in the annual barangay and municipal development plans
c) Conduct massive information campaign about agroforestry through the respective barangay, municipal and provincial governments
d) Provide support in the packaging and marketing of the farmers' agroforestry products through establishing market links, and inviting them during trade fairs
e) Explore possibilities of creating plantilla items for agroforesters at the Municipal Environment and Natural Resources Office (MENRO)

f) Initiate the delineation and classification of agroforestry areas within their areas of jurisdiction

APPENDIX 5. PHOTODOCUMENTATION OF PROJECT ACTIVITIES

Participants of the National Training of Junior Lecturers and Technicians on Climate Change Mitigation and Adaptation Strategies in Vietnam held on December 7-8, 2011

Training participants identify the climate change mitigation strategies for their respective areas in Vietnam

Training participants identify the climate change mitigation strategies for their respective areas in Vietnam

Policy Dialogue on Agroforestry held in Vietnam, December 9, 2011

Participants of the National Training on Climate Change Mitigation and Adaptation in Indonesia, November 12-15, 2011

Participants of the National Training on Climate Change Mitigation and Adaptation in the Philippines, March 13-16, 2012, SEARCA International Residence Hotel, UPLB, College, Laguna, Philippines

Levelling-off expectations of the training participants during the National Training on Climate Change Adaptatiion Strategies held in the Philippines

WORKHOP: Identifying the evidences of climate change in the respective areas of the training participants (National Training on Climate Change Adaptation Strategies held in the Philippines)

Policy Dialogue on Agroforestry was conducted in the Philippines on September 22, 2011 with participants coming from the academic institutions, national government agencies, House of Representatives, non-government organizations, local government units, and research institutions

TAY NGUYEN UNIVERSITY
Vietnam Network for Agroforestry Education
VNAFE

Training Workshop and Dialogue

Promoting Agroforestry for Climate Change Mitigation and Adaptation

ASSOC. PROF. DR. BAO HUY
DR. VO HUNG
DR. NGUYEN THI THANH HUONG

Tay Nguyen University, Vietnam, 8 – 9 December, 2011

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Illustrations

SUMMARY

Mitigation and adaption concepts, impact analysis of climate change to agriculture and forestry, solutions for climate change through Agroforestry including application of GIS, and dialogues related to situations and solutions for promoting agroforestry were covered as part of a training workshop and dialogue held in Tay Nguyen University on 8-9 December 2011.

The training workshop/dialogue was divided into two parts. Firstly, attendees worked in teams or individuals to contribute their ideas with given problems/questions. The workshop provided trainees useful materials on promoting agroforestry for climate change mitigation and adaptation, and GIS data for analysis land use change. A short practice with GIS was done by individual in GIS laboratory. Secondly, the key people who are in different management positions invited to take part in dialogue part. Plenty of ideas and solutions were gained through the dialogue.

Training/workshop

1 Background and training workshop objectives

There is no way to completely avoid the negative impacts of climate change. This is considered the result of natural phenomena under indirect and direct impacts of human. So far in many parts of the world have experienced on how to deal with climate change. One of the strategic policies is to strengthen the mechanisms of adaptation through suitable agriculture and forestry activities through agroforestry, especially for farmers.

Vietnam is an agricultural country, with 70% of the population accounts involved in agricultural and forestry production. The farmers are certainly vulnerable to climate change due to produce with small scale. With the reality, except for policy of capital support, information and knowledge on climate change should be provided to the farmers so that they can identify the basis of seasonality, species selection, and technical planting. Agroforestry, a land-use management system that combines the production of agricultural crops with the woody perennials, livestock and/or aquatic resources, is one of the interventions that are being considered in climate change mitigation and adaption.

With the financial support of the Asia-Pacific Network for Global Change Research (APN), Network for Agroforestry Education in Vietnam (VNAFE) represented by the University of Tay Nguyen organized a Training workshop on "Agroforestry promotion for Mitigation and Adaptation with Global climate change". The participants were technicians, lecturers and forestry and agricultural staffs who come from the different provinces belonging to the Central Highlands.

The attendees are expected to be able to

- Explain concepts of global climate change (GCE) and effects of GCE to agriculture and forestry
- Define potential solution for climate change mitigation and adaptation through agrofrestry promotion
- Assess land use change with emission of green-house gas and solutions of agroforestry development for reducing emissions.

2 Training workshop program, method, and participants

2.1 Training program

The training/workshop was held 1.5 days, from 8 – 9 December, 2011 in Tay Nguyen University

Table 1: Program/Method of the training

Id	Topics	Method/Materials	Time
1	**Climate change concept**		
	Climate change	Presentation Flashlight	Morning 8/12/2011
	Mitigation and adaptation with climate change Effect of climate change to agriculture and forestry	Presentation Phillip 5/9/4	
2	**Agroforestry and climate change**		
	General awareness Solution for climate change mitigation and adaptation in agriculture and forestry	Presentation Brainstorming	Afternoon 8/12/2011
	Reducing emissions through agroforestry Application of GIS in monitoring land use change and CO_2 emission. Agroforestry as solution to reduce CO_2 emission	Presentation Practice on computer and ArcGIS about Land use/land cover mapped from SPOT 5	Morning 9/12
3	Agro forestry and climate change (cont.)		
	Adaptability with climate change through agroforestry	Presentation General discussion	Morning 9/12

2.2 Training participants

Twenty two people participated in the training/workshop. They are young lecturers of the Universities, staffs of agriculture extension centers, researchers of Science and Technology Institute of Forestry and Agriculture, staffs of forestry departments.

Table 2: List of participants of the training

Id	Full Name	Position	Agency Name
1.	Lê Công Trường	Deputy of Forest Department	Forest Department of Daknong Province
2.	Triệu Thị Lắng	Lecturer	Tay Nguyen University
3.	Trần Thị Xuân Phấn	Lecturer	Tay Nguyen University
4.	Hoàng Thị Trà Mi	Staff	Extention Center of Buon Ma Thuot City
5.	Đinh Thị Hiệp	Staff	Extention Center of Gia Lai Province
6.	Nguyễn Tấn Vinh	Staff	Extention Center of Daklak Province
7.	Cao Thị Hoài	Lecturer	Tay Nguyen University
8.	Phan Thị Hằng	Lecturer	Tay Nguyen University
9.	Hoàng Trọng Khanh	Lecturer	Tay Nguyen University
10.	Hồ Tiến Cương	Head of Science and Technology	Extention Center of DakNong Province
11.	Hồ Đình Bảo	Lecturer	Tay Nguyen University
12.	Hồ Công Vũ	Head of silvicultural department	Forestry Department of Kontum Province
13.	Huỳnh Cao Thoại	Staff	Forestry Department of Gia Lai Province
14.	Lê Thị Ánh Tuyết	Staff	Forestry Department of Daklak Province
15.	Nguyễn Thị Tình	Lecturer	Tay Nguyen University
16.	Hoàng Thị Ái Duyên	Reseacher	Tay Nguyen Science and Technology Institute of Forestry and Agriculture
17.	Hoàng Hải Long	Reseacher	Tay Nguyen Science and Technology Institute of Forestry and Agriculture
18.	Nguyễn Thị Phương Uyên	Staff	Forestry Department of Daklak Province
19.	Phạm Đoàn Phú Quốc	Lecturer	Tay Nguyen University
20.	Lê Đăng Pha	Staff	Department of Science and Technology of Daklak
21.	Phạm Ngọc Tuân	Lecturer	Da Lat University
22.	Nguyễn Thị Ngọc Quyên	Lecturer	Tay Nguyen University

3 Output workshop

3.1 How does climate change affect Forestry and Agriculture?

4 groups were established with 5 people each. The question above was done by Phillip method (5/9/4). The ideas were divided into four main aspects, and indicated in table below:

Table 3: Climate change effects to Forestry and Agriculture

Forestry	**Natural resource**	**Agriculture land**	**Likelihood**
- High risk of forest fire - High risk of natural resource decrease	- Flooding - Drought - Lack of fresh water - Lessen under-ground water due to loss of forest	- Narrow cultivation land - Desertification - Salt invading - Erosion - Degradation of soil - Seasonal change - High risk of pest for crops - Influence of crop structure	- Poverty - Likelihood decrease especially people living near the see and whose job of salt industry

Figure 1: Group discussion of climate change effect to forestry and agriculture

3.2 Which are solutions for mitigation climate change

Brainstorming method was used to collect the ideas from attendees; various ideas were given and divided into different groups. Ranking was done by choosing the three key ideas from attendees. The result is indicated in table below

Table 4: Solutions for adaptation with climate change

Id	Group solutions	Mark	Ranking
1.	- Plantation - Replantation - Forest enrichment	13	1
2.	- Sustainable slopping cultivation - Agroforestry - Crop diversity - Perennial crop with annual crop	12	2
3.	- Forest protection and development - Vegetation protection - Vegetation increase - Reduction of forest logging and destruction - Sustainable exploitation - Forest fire control	12	2
4.	- Biogases - Economic use of energy	3	3
5.	- Reuse of harvested products - Limit of combusting harvested sub-products	3	3
6.	- Change of cultivate traditional	2	
7.	- Application of science and technology in forestry and agriculture - Land use planning	2	
8.	- Suitable water use	2	
9.	- Benefit sharing in environment services of forest	1	
10.	- Gene conservation	1	
11.	- Pest management - Limit of pesticide and chemical fertilizer	1	
12.	- Increase of crop quality	1	

Figure 2. Votes for mitigation solutions

3.3 Which are solutions for adaptation with climate change

Similar above, brainstorming method was employed to collect the solutions from the attendees. Set of ideas grouped and ranked as follows:

Table 5 Solutions for adaptation with climate change

Id	Group solutions	Mark	Ranking
1	- Agroforestry development - Sustainable agricultural development - Cultivation on contour lines	11	1
2	- Suitable crop structure - Adaptive cross-breeding creation - Seed selection	8	2
3	- Appreciate social policy - Monitoring and prediction system	8	2
4	- Sustainable exploitation of forest - Suitable use of natural forest - Bench for forest fire control	4	3
5	- Research CO2 absorption - Application of advance technology science - Scientific research for agroforestry on farm	4	

Id	Group solutions	Mark	Ranking
6	- Embankment for preventing erosion - Designing irrigation system for water balance	3	
7	- Forest reforming - Plantation - Forest enrichment - Forest maintaining	2	
8	- Change traditional cultivation	1	
9	- Gene conservation	1	
10	- Bench fire control	1	
11	- Integrated pest management	1	
12	- Preserving protection forest	1	
13	- Selection of suitable seasonal	1	

Figure 3. Votes for adaptation solutions

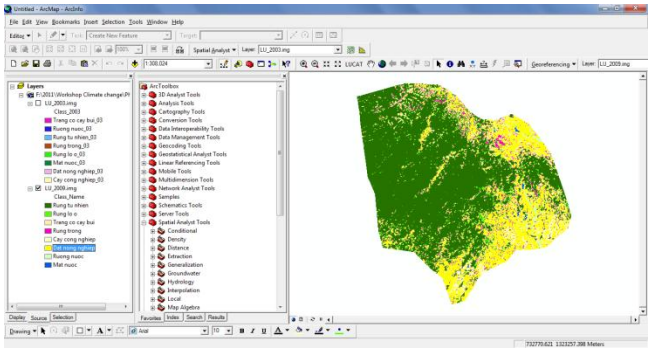
3.4 How to apply GIS in monitoring emissions from land use change

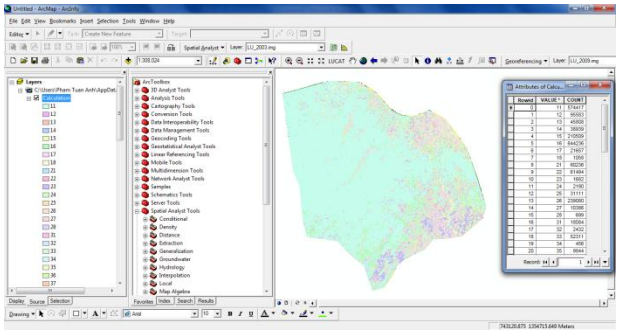
A review of GIS application in analyzing land use change and emission was given, simultaneously, carbon sequestration and CO_2 absorption was calculated based on the

area from result of land use change analysis using ArcGIS along with the available results of carbon studies.

A data set of district land use image files of 2003 and 2009 which classified from SPOT 5 data were provide to attendees in order to practice GIS with land use change analysis.

In this assignment, the attendees were required to map land use change using ArcGIS. The results were stored in two different formats. One is spatial image, another is presented in attribute table. Based on the attribute tables of land use and land use change areas, calculations of carbon and CO_2 of 2003 and 2009 were done. An agroforestry scenario applied to replace the class of agricultural land was applied to compare changes of carbon stored as an example.





Attributes of ma tran thay doi

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Rung lo o_03	6023600	6149400	168200	219000	3
Trang co cay bui	1808400	243200	5231100	45600	9
Rung trong_03	1129500	4600	68300	2476800	1
Cay cong nghiep_	4709700	258900	1186600	1442700	28
Dat nong nghiep_	2352400	229000	4155100	261500	4
Ruong nuoc_03	5272300	1074800	1554500	622000	7(
Mat nuoc_03	17900	0	0	9800	

Record: 1 Show: All Selected Records (0 out of 8 Selected) Options

Figure 4. Land use change and emissions analysis using ArcGIS

Dialogue

1 Dialogue objective, method and topics for discussion, participants

In Vietnam, reason of economic efficiency, so much land area cultivated monoculture crops or industrial tree either, especially on slopes this method has created a loss of sustainable.

In the situation of climate change, need improvements in sustainable land use, including agroforestry to recognition as the solution to mitigate and adapt to climate change. But there are still lack of the institutions, organizations and policies to support farmers apply agroforestry.

So this dialogue was to propose policy solutions for developing argroforestry in order to mitigate and adapt global climate change

Method of the dialogue:

- Presentation of summary on climate change, its affect to agriculture and forestry, agroforestry as solution for mitigation and adaptation
- The guest was asked to discuss/answer four main topics:

1. Why has not agroforestry performed in all slopping land area? While many monoculture land use with too much water?
2. Is there any policy to support farmers to promote agroforestry currently? If so, how to conduct?
3. In the context of climate change, to sustainable farming methods agroforestry is the solution to mitigate and adapt. In order to apply in large scale, what is required of institutions, organizations and policies?
4. How should the value of environmental services of agroforestry be recognized?

The dialogue not only got answer from the Guest but also as panel discuss among young people who are working for farming system and managers.

Participants of the dialogue: Seven guests who are managers/leaders of province, agriculture-forestry companies, agriculture and forestry department, provincial extension centers; all participants of the training also were involved in the dialogue.

After finishing the training, the dialogue was held in haft a day on 9 December, 2011

Table 6: The Guests of the dialogue

Id	Full Name	Position	Agency Name
1.	Phạm Tuấn Anh	Vice Chair	People's committee of Dak Mil District
2.	Nguyễn Trương Bình	Deputy Director	Forestry company of Lak
3.	Phạn Thế Minh	Director	Forestry company of Madrak
4.	Lê Văn Dĩ	Director	Forestry company of EaWy
5.	Trần Văn Khoa	Head	Protection Department
6.	Nguyễn Tuấn Khải	Director	Extension Center of Dak Nong Province
7.	Ngô Nhân	Deputy Director	Extension Center of Dak Lak Province

Figure 5. Dialogue session

2 Outcome of the dialogue

The dialogue topics were concentrated in 4 questions. Below is the result of the dialogue, discussion.

2.1 Why has not agroforestry performed in all slopping land area? While many monoculture land use with too much water

- The policy institutions are the main reasons: 1) land ownership is unclear, many projects have taken land, however, many projects have currently not continued. As a result the lands appropriated by them have not used leading to be waste while the local farmers have not enough land to cultivate; 2) the land use planning was not based on rationality and requirement but only concerned how to disburse budget; 3) lack of supports for instructions on transfer crop structure in their fields as well

as lack of mechanism for the transferring land use and 4) market for products is also a problem.

- Farmer has not aware of the impact of climate change on their lives
- The government has not made clear its role in directing farmer to promote agroforestry, most farmers cultivate their land in spontaneity.
- It is difficult to carry out the established mechanism in practice. Lack of resources and funding, particularly the lack of synchronization mechanisms in order to promote agroforestry
- Despite the policy of cultivation land for the ethnic groups was issued, the implementation and management have not been of asynchronous and unreasonable
- Most slope lands are used by business owners and the poor people. For investment restrictions the business owners are not applied agroforestry in their lands, meanwhile, the poor are for the purpose of immediate economic, they also do not apply agroforestry
- Despite the scale of investment and training for agroforestry are implemented, the spread is limited. Therefore, policy mechanism to spread the good models should be concerned.
- Presently, the FLITCH project support 400 USD per ha to promote agroforestry, but the implementation is very low. The cause is of difficulty to culture perennials on farmland.
- Due to difficult in mechanization, rubber farmland are planted in monoculture way.
- There were some policies aiming to facilitate agroforestry such as program of 135 and 178, but general guidelines are not specific and therefore it is difficult to implement.
- People do not have benefit from the environmental value; there is no regional planning for production, hence farmer's production is spontaneous and running ahead of economic goals.
- No mechanism of administrative penalty for land use which does not follow the land use planning has been issued.
- The conversion of forest to monoculture rubber plantations under government policies have destroyed forests and affected the environment due to using chemicals and mechanized farming on a large scale.

- Although there are regulations of using slopping land, they end at recommendation levels but there is no legal to bind.
- It is difficult to change traditional farming practices
- Agroforestry in sloping land requires high investment of resources, finance, and technique, and difficulty of transportation and mechanism.
- It is difficult to loan capital.
- Finding a suitable conditions for agroforestry in specific place is still limited
- Duration of agroforestry to provide effective economic is long
- Most of the experimental models focus on households of ethnic minorities. But because of economic difficulties, it is difficult to encourage or spread.

2.2 Is there any policy to support farmers to promote agroforestry currently? If so, how to conduct?

- Information of technology and science was provided.
- Many organizations promote agroforestry with different models. However the implementation of the model sometimes overlaps or inconsistencies on the same local
- Some models were carried out based on the ideas of farmer in Daklak
- Biogas for rural people to save energy, reduce emissions into the environment while reducing fuel from logging were made.
- There is policy to support to farmer in Acacia plantation in previously forested areas cleared was done.
- Up to now in Vietnam lack of law or policy to apply agroforestry on the sloping land.

2.3 In the context of climate change, to sustainable farming methods agroforestry is the solution to mitigate and adapt. In order to apply in large scale, what is required of institutions, organizations and policies?

- Regulations and policies should be clearly and specifically of benefit sharing the environment to apply agroforestry, especially poor people are mainly interested in the short-term economic.
- Agroforestry policy must come directly to the people, not theoretical paper
- Rules on the use of cultivation on steep slopes to ensure environmental sustainability should be clearly issued

- Land use rights must be clear
- Approaches in agroforestry should be concerned
- The policy on product market should be considered.
- Policy support for agroforestry products
- The role of the state in sustainable agroforestry production should be clear
- Support for policy loans
- Plan and policies of implement on agroforestry farming landscape
- Policies to support farmers for cooperatives with a rational organization to focus on production, which can be commodities.
- Institutions to support changing farming practices and crop structure are necessary.
- Forest land allocation policy to people with benefit sharing mechanisms and clear should be done.
- There are legal mechanisms such as taxation of crops harming the environment (rubber) or use more water (coffee)
- Development of agroforestry into a national program
- Exemption for agroforestry products should be concerned.

2.4 How should the value of environmental services of agroforestry be recognized?

- Specific policies of benefits from the environment for agroforestry especially poor people should be defined.
- Policy of payment for environmental services should be issued.
- Planning and policies on agroforestry farming landscape should be done.
- PES and REDD should include agroforestry.
- The economic benefits between two forms of agroforestry and monoculture by the certificate for the model and demonstrate the efficiency and reduce CO2 emissions should be harmonize solved.

Conclusion and recommendation

The training/workshop provides opportunity for sharing information/experiences of issues related to climate change with agroforestry among the people coming from different agencies and positions. The method used in the workshops is designed to encourage maximum engagement from participants. As a result many useful ideas of issues and solutions were contributed from the attendees. GIS was practiced with small function of land use change and emission control analysis made attendees feeling more active and attracted.

Through the training workshop, climate changes were defined affecting to natural resources such as forest, underground water, flooding and drought; agricultural land like erosion, desertification, crop pest; and livelihood as poverty, unemployment, and so forth.

Of which twelve solution groups for mitigation of climate change were given, the three groups were selected with the highest marks. They are pertaining to 1) Forest such as plantation and forest enrichment; 2) Sustainable agroforestry on slopping land; and 3) sustainable forest management and vegetation increase.

Fourteen solution groups were shown to adapt with climate change. The four groups with the highest marks are related to 1) Sustainable cultivation on slopping e.g. agroforestry; 2) Seed selection and creation, and suitable crop structure; 3) Social policy and prediction system; and 4) Sustainable forest management and exploitation.

GIS application is also determined as a solution in monitoring and prediction of changes of carbon sequestration.

The results gained from the dialogue indicate that policy and mechanism in land use and land tenure are very important to apply agroforestry as solutions to mitigate and adapt with climate change. The support for farmer in techniques capital and providing information are need to consider, especially, policies of environment value payment from agroforestry should be high take into account.

Materials for training workshop/dialogue

- Bao Huy, Vo Hung, and Nguyen Thi Thanh Huong, 2011. Workbook: Agroforestry with Climate Change. VNAFE

- Classified images of 2003 and 2009 based on SPOT 5 data of Tuy Duc District, DakNong Province, Vietnam

- Promoting Agroforestry for Climate Change Mitigation and Adaptation, 2010. Policy Brief, SEANAFE. The University of the Los Banos.

Narrative Report of National Workshop on Policy Dialogue Towards Institutionalizing Agroforestry as a Development Strategy and the National Training of Junior Scientists and Extension Workers Under Funding Support From the Asia-Pacific Network for Global Change Research (APN) through the Philippine Agroforestry Education and Research Network (PAFERN)

This report is made under agreement between LaoNAFE and PAFERN under funding support from the Asia-Pacific Network for Global Research (APN) to conduct two activities. The first activity was to organize National Workshop on Policy Dialogue towards Institutionalizing Agroforestry as a Development Strategy and the second activity was on the National Training of Junior Scientists and Extension Workers.

The first activity was successfully completed on 29th November 2011 in Faculty of Forestry, National University of Laos. Three papers were presented in the workshop. The first paper discussed on roles of Agroforestry in climate change mitigation. Second paper discussed livelihood and landscape change a case study to represent middle and southern parts of Laos. Third paper was focusing on sustainable upland models of agroforestry system of Northern Laos in relation to climate change adaptation and mitigation. Participants were from LaoNAFE member institutions, which include 22 participants from six institutions such as Department of Forestry, National Agriculture and Forestry Extension Service Center, National Agriculture and Forestry Research Center under Ministry Agriculture and Forestry and Environmental Division under Ministry of Energy and Mines. The workshop served as a venue for sharing and discussing on roles of agroforestry systems on environmental protection. The plenary was designed to encourage all participants to share, discuss issues that they have experienced especially lessons learned and problem encountered from previous and ongoing activities.

All participants expressed interest to the workshop. One of key lessons learnt in the workshop duration was too short. There should be sufficient time for discussion among participants and allow additional time for field excursion. Therefore, this kind of workshop should be organized for at least 2 days that participants will learn more from local

practitioners on current situation. During plenary session, participants were divided into groups according to their expertise for brainstorming to draw ideas to reflect and bridging the gaps between research and policy on climate change mitigation and agroforestry issues. First group included policy and decision makers, while researchers (including extensionists) were in second group, and the third group included traders and local villagers. Each group discussed on issues and suggested on how to overcome constraints.

Participants expressed their interest to the outcome of the workshop and also request to organize similar workshop more frequently so that the lesson and issues can be discussed and will continue raising awareness of the society in the subject.

The second activity was on the National Training of Junior Researchers and Extension Worker and it was successfully organized on 9-10th January 2011 in Faculty of Forestry, National University of Laos. Sixteen participants were attended the training. During training session, participants were provided opportunity to familiar with climate change and its effects, learnt existing agroforestry models in mitigating and adapting of current visible impact of climate change within Southeast Asia and Lao PDR, carbon sequestration and carbon marketing, survey method on how to estimate carbon stocks and field practices. Participants were enabled to present what they have learnt from the exercises.

The two activities would not be completed without funding support from the Asia-Pacific Network for Global Change Research (APN) through the Philippine Agroforestry Education and Research Network (PAFERN). Therefore, LaoNAFE is highly appreciated the support and collaboration extended by both APN and PAFERN.

CLIMATE CHANGE MITIGATION AND ADAPTATION STRATEGIES FOR AGRICULTURAL PRODUCTIVITY IN INDONESIA

SEAMEO BIOTROP - BOGOR, 12-15 DECEMBER 2011

By
INDONESIA NETWORKS FOR AGROFORESTRY EDUCATION (INAFE)

Background/Rationale

There is no way out to climate change. This natural and human-induced phenomenon is indeed being experienced worldwide, and the way to cope with it is to enhance the adaptation mechanisms of the agriculture sector, especially the farmers.

Indonesia as similar as other South East Asian countries is generally an agricultural region, and most of the human populace is engaged in farming. The small-scale farmers are definitely more vulnerable to the climate change that is currently being experienced in the country. These small-scale farmers are vulnerable in the sense that they have limited access to crop forecasting, basic agricultural services, and more importantly capital. These limitations would definitely contribute to the declining farm productivity. Given these, the agricultural technicians of the different local government units should be equipped with the knowledge and skills in educating these small farmers about the issue on climate change, and how farmers could mitigate and adapt to this global problem.

In line with this, the Philippine Agroforestry Education and Research Network (PAFERN), in collaboration with the member-country of the Southeast Asian Network for Agroforestry Education (SEANAFE) i.e. Indonesia (INAFE) organized a National Training of Junior Scientists and Local Extension Workers. As one of the project components of the APN-funded project "Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through Local Capacity and Policy Development in Southeast Asia", this training course intends to convene the junior lecturers of different country network members, and the selected staff of the local government units that are providing technical and extension services to the upland farmers.

Objectives

The general objective of this training course is to equip the junior lecturers and agricultural technicians from the local government units, with the knowledge, skills and attitude in climate change mitigation and adaptation strategies for possible dissemination among the farming communities within their respective areas.

At the end of the training course, the training participants are expected to:

1. Share the recent climatic changes in their respective areas based on the current state of agricultural production
2. Explain the concepts, issues and impacts of climate change to the agricultural sector;
3. Assess the suitability of different climate change mitigation and adaptation strategies in their respective areas
4. Prepare an action plan that is geared towards promoting appropriate climate change mitigation and adaptation strategies among the farming communities

Methodology

1. Lecture-discussion and experiential learning approach shall be employed in this training course to encourage effective transfer of learning, and direct application of learning and experiences to achieve the training objectives.
2. Operational arrangement as collaboration between SEAMEO-BIOTROP and INAFE based on MoU as attached in this report (Appendix 1.)

Training Modules

Module 1. Understanding Climate Change

This module aims to level off the understanding of the participants about climate change. It shall provide the basic concepts of climate change, with emphasis on its impacts to the agriculture/farming sector. In addition, the participants will also be encouraged to share their actual experiences or observations about the changing climatic conditions in their respective areas based on the current state of agricultural production. This module has been undertaken through a lecture-discussion and sharing of experiences/reporting. Topics under this Module as follows:

Topics	Methodology
Leveling-Off Understanding About Climate Change	Using metacards
Basic Concepts and Issues of Climate Change	Lecture-discussion Sharing of experiences
Impacts of Climate Change to the Agriculture Sector	Lecture-discussion Sharing of experiences
TOTAL	

Module 2. Climate Change Mitigation and Adaptation Strategies

This module dwelled on the different agricultural practices and land use management systems that could be an option among the farming communities to adapt to climate change in their respective areas. These agricultural practices may include the: soil and water conservation and management; integrated pest management; organic farming/agriculture; water use efficiency; and, agroforestry.

Topic	Methodology
Climate Change Mitigation and Adaptation Strategies: Lessons and Experiences from Research Sector	Lecture-discussion Sharing of experiences
Organic Farming/Agriculture (e.g. use of organic fertilizers, use of farm wastes for compost, etc)	Lecture-discussion Sharing of experiences Hands-on experiences/field trip
Integrated Pest Management	Lecture-discussion Sharing of experiences Actual application/Hands-on
Basic Concepts and Principles of Agroforestry and its Potentials in Climate Change Adaptation	Lecture-discussion Sharing of experiences
Soil and Water Conservation and Management	Lecture-discussion Sharing of experiences Hands-on experiences/field trip
TOTAL	

Module 3. Creating Awareness About Climate Change and the Adaptation Strategies

Based on the learnings from previous modules, each participant developed his/her indicative action plan that is geared towards creating awareness about climate change and the climate change mitigation and adaptation strategies, among the farming communities within his/her respective area of assignment.

Activity	Methodology
Action Planning	Individual work with guidance from the training team
Presentation of action plans	Plenary presentation
TOTAL	

Participants

The target participants of this training course are the junior lecturers and extension workers from the local government units. Previously 20 participants from INAFE member and 5 persons extension workers but at the training date all extension workers cancelled their participation due to have go to another field works that ordered by their head. Finally there were 17 participants of training and list of the participants as attached in this report. List of participants as attached as Appendix 2.

Criteria of participants

1. The project team may use the following criteria in the selection of training participants:.
   a) Employed in an academic institution that is a member of a national country network on agroforestry education (in the case of junior scientists), and in a local government unit (in the case of local extension workers/technicians)
   b) Currently engaged in agroforestry education, research or extension activities of the nominating institution
   c) Relevant work and training experiences in agroforestry and related fields
   d) Willingness of the nominating institution to provide counterpart (in any form that may be decided upon by the project team, such as shouldering the travel allowance/expenses, etc)

Time and Venue

Training had been conducted on 12 – 15 December 2011 in SEAMEO – BIOTROP, Jl. Raya Tajur, Bogor.

TRAINING SCHEDULE

"Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through local Capacity and Policy Development in Indonesia"

BOGOR, 12 - 15 DECEMBER 2011

Monday, 12 Dec 2011			
start to 12.00	Participants check in		
19.30 - 21.00	Her Regristation and Training Explanation in Meeting Room		
Tuesday, 13 Dec 2011		Dr.Bambang Purwantara	
08.30 - 09.15	Opening Ceremony	Prof. Sugeng P Harianto	
	Topics		**Methodology**
09.30 - 10.00	Leveling-Off Understanding About Climate Change	Dr. Christine Wulandari Rommy Qurniati S.P.,M.Si	Using metacards
10.00 -12.00	Basic Concepts and Issues of Climate Change	Dr. Meine van Noordwijk	Lecture-discussion
		ICRAF	Sharing of experiences
13.00 - 15.00	Impacts of Climate Change to the Agriculture Sector	Prof. Kurniatun Hairiah	Lecture-discussion
		University of Brawijaya	Sharing of experiences
	Soil and Water Conservation and Management		Lecture-discussion
15.15 - 17.15		Dr. Fahmudin Agus/ Balitan	Sharing of experiences

		Assistant	Hands-on experiences/field trip/ Assignment
			Lecture-discussion
19.30 - 21.30	Basic Concepts and Principles of Agroforestry and its Potentials in Climate Change Adaptation	Dr. Budiadi	Sharing of experiences
		Gadjah Mada University	
Wednesday, 14 Dec 2011			
08.00 - 10.00	Climate Change Mitigation and Adaptation Strategies: Lessons and Experiences from Research Sector	Dr. Niken Sakuntaladewi FORDA	Lecture-discussion
10.00 - 11.00	Sharing experiences of AF practices	Prof. Sambas/ Gadjah Mada University	Sharing of experiences
	Sustainable Farming/Agriculture (e.g. integrated pest management, use of organic fertilizers, use of farm wastes for compost, etc)		Lecture-discussion
11.00 - 13.00		Dr. Dami Buchori/ IPB	Sharing of experiences
13-14: Lunch			Hands-on experiences/field trip/Assignment
14.00 - 16.00	Policy and Regulation on Agroforestry and Climate Change: Status and Development	Dr. Christine Wulandari	Lecture-discussion
		Lampung University	Sharing of experiences
16.00 -18.00	Socio-economic Aspects on Climate Change Mitigation and Adaptation Strategies	Dr. Mahrus Aryadi	Lecture-discussion
		Unlam	Sharing of experiences
19.00 - 21.00	Working for Action Planning	Prof. Riyanto/ Unmul & Rommy Qurniaty, S.P., M.Si	
Thursday, 15 Dec 2011			

08.00 - 10.00	Action Planning	Prof. Hadi Susilo Arifin/ IPB	Individual work with guidance from the training team
10.00 - 12.00	Presentation of action plans	Prof. Hadi Susilo Arifin/ IPB	Plenary presentation of all participants
12.00 - 13.00	Closing Ceremony		
	Lunch		
Afternoon	Participants check out		

Training Results

1. Open remarks from BIOTROP Director

This training topic is very strategic to be associated with forestry issues today. Because of our position as a developing country and developed countries is different, we are encouraged to improve the forest, we also received the impact. Indonesia is identified as the third largest country that provides the greatest emissions. Such conditions make Indonesia difficult to sell their forests products. Besides, Indonesia is also dominated by oil palm plantations. With AF, it is expected to be one solution to these problems. If associated with climate change, there is a funding scheme to overcome this. There are several schemes that offers, such as REDD, but the AF concept is not included. But that is not a problem. What we think about is how to tackle climate change with AF, could be in the field level as well as policy level. Agroforestry (AF) is an activity related to forestry and community forestry interests. This is the strength of AF associated with climate change and will have a more "trade off" compared to industrial plantations (HTI). The strength of AF is the element of livelihood, which can be used to address the socioeconomic issues related to forestry and climate change. Many question why the AF is not included in the concept of REDD funding. So far, AF meets the criteria, but there is other consideration, that is whether the community as actors directly involved to support of REDD?. Therefore, this could be a "research" critical question whether AF could also support REDD both in terms of adaptation and mitigation?

2. Leveling-Off Understanding About Climate Change

There are some statements that could be as leveling off understanding of participants that related to agroforestry and climate change, as examples:

2.1.Agroforestry

2.1.1. Agroforestry is a management system that combines the forestry and agriculture system (livestock farming, honey bee, silkworm culture, etc.). The agroforestry system could overcome the problems that occur in the forestry system or agriculture system, for example: in the monoculture farming, its harvest and its subsequent are transported out of the land, so there is no filling of organic matter in the soil, but in

the agroforestry systems, the litter or leaves of the trees will still remain to restore the organic matter to the certain material so that the soil fertility is sustainable.

2.1.2. Agroforestry is a pattern of land use that combines between the agricultural commodities in general with the forestry commodities. Climate change is the change of climatic conditions that could be experienced in general because of the increased temperature and changes pattern or precipitation shifting.

2.1.3. Agroforestry: A system of sustainable land management by combining the sphere of forestry with the sphere of farming and or livestock on the same land in the same time or shifting, and docking with the local culture.

2.1.4. Agroforestry is a system of integrated land use that combines the land-based plant trees/ wood, crops, livestock, and also fish at the same time or shifting that turns simultaneously to have the function of ecological, economic, social and cultural rights.

2.1.5. Agroforestry: Collective terminology for the systems and technologies of land use that are planned to be implemented in a land with the combination of woody plants and agricultural crops or animals (livestock) or fish that are carried out simultaneously or in shifting to form the infraction of ecological, social, and economical with the various components.

2.2.Climate change

2.2.1. Climate change is a change of climatic conditions including temperature, precipitation, and humidity. Such changes could lead to a condition of wet extreme or dry extreme. Climate change could affect the agricultural production, such as the explosion of pests or diseases and could affect the human health. But then, climate change could also benefit the agricultural production by proper farm management, such as by the Agroforestry system.

2.2.2. Climate change: Long time ago, the climate in Indonesia was in order, the early rainy and dry season could be sure, so that farmers could set the cropping pattern as well. In present, the carbon emissions and its friends that are called the greenhouse gases cause the increasing of atmosphere temperature. This causes the climate to be not in order or so-called climate change. This climatic irregularity is caused to the uncertain

of the early of rainy season and dry season, so that farmers are failed to harvest or less production. The increasing of air temperatures will also lead to the attack of certain pests and diseases that decrease productivity. Climate change could be overcome by mitigation and adaptation through innovation on the plant, plant shifting, etc. to benefit the farmers.

2.2.3. Climate Change: Changes in temperature, air pressure, wind, precipitation and humidity as a result of global warming, the global warming is caused by human activities as well as the use of fossil fuel that make the carbon emissions to be so high.

2.2.4. Climate change is a change of climate due to the changing of greenhouse gases concentrations in the atmosphere that caused by the increased of human activity associated with the land use, energy use (fossil fuels) of industries, etc.

2.2.5. Climate change: The change of temperature and precipitation that occur gradually over a long period of time, usually are caused by human activity, especially related to the combustion of fossil and land conversion.

3. Action planning of training participants

There are some action planning of participants

3.1. Development of AF as an improvement effort of land productivity in a sustainable manner

Background.

The observed region is a hilly area with high precipitation, which is above 1300mm/year. A recurring problem is the frequent occurrence of erosion and flooding in the rainy season and water shortages in the dry season. The occurrence of high water fluctuation is as a result of illegal logging and the high switching functions of protected areas for other purposes, so the impact is quite a big on the physical condition of the surrounding area, such as erosion and floods, and loss of water resources. The reducing of soil fertility today is because of erosion caused by land use with the steep contoured, even very extreme for agriculture. For the handling of the decline in soil fertility, it is used organic

fertilizers derived from the local area.

Objectives: Enhance public awareness of land management activities through agroforestry, improvements on land productivity in a sustainable manner with KTA activities, enhancement of community participation by providing counseling and mentoring program.

Advantanges: The community understand the sustainable way on the environmental management; There are improvement of land condition, whether physically, chemically and biologically; and increased farmers' income because of the sustainability of land use.

The solutions offered. Improvement methods which offered to address the problems in the vulnerable land of erosion in Banaran village to increase the soil productivity are through:

a. Technology of soil rehabilitation with the practices of soil conservation and technology of soil fertility improvement with the use of fertilizers to re-productive the land, such as: Planting crops as terrace amplifier, make and / or repair the water channels, Making the waterfall building (*trucuk*), Making hole water infiltration, and making organic fertilizer from local raw materials.

b. Improvement of physical condition of land with cropping system improvements

c. Enhance community participation with providing counseling and mentoring program.

Farmer participation in this program are expected to be able to:

Understand and able to carry out agro-forestry development activities to increase land productivity, liked to duplicate a good agriculture model for the specific conditions of such land, and play the role actively and support the environmental management in a sustainable manner.

Target Outcomes.

Target outcome of this program is expected that farmers as the object would understand the importance of changing behavior patterns on their land management to make it

powerful and have a high economic value. While is the universities (Servant) will feel happy and relieved that the results of their results of research could be accepted directly by the community through an adequate guidance. It is expected that the target community will be able to spread to another community ("word of mouth") about the application of this knowledge in order to enjoy a good yield improvement through: Application of soil and water conservation technologies for the rehabilitation of vulnerable land of erosion, Creation of organic fertilizer production from livestock waste and/ or plants from local raw materials, in order to increase soil fertility and could reduce the need of inorganic fertilizer and the Creation of lower crops culture diversification under sengon stalk, so it is expected to shaped a soil protection against the destructive erosion and surface runoff on the one hand, and on the other will increase farmers' income through crops cultivation.

3.2. IDENTIFICATION OF AGROFORESTRY DISTRIBUTION IN THE UPSTREAM OF WAMPU RIVER BASIN IN THE CLIMATE CHANGE MITIGATION

Introduction.

It's been so long that People Forests has been developed and provide benefit for the community, but until today, data and information about the distribution and pattern of people forest management has not been known well. Moreover the shape and pattern of public forests in the Upstream of River Basin that is located in the North Sumatra Province. The People Forests have some differences, and each characteristic are according to its community cultural. De Foresta (2000) in Hairiah, *et al.*, (2003) states that the forest people, especially those based on trees (agroforestry) are difficult to identify in the field because of the diversity format and resemblance with the natural forest. However, to obtain spatial distribution of information, it should attempt to use remote sensing and spatial analysis to identify its spread, to obtain information on potential spreading spatially.

Purpose.

To know the spatial distribution of people forest with agroforest pattern in the Upstream of Wampu River Basin, To know the characteristics of people forest and carbon stock of agroforest patterns (land use patterns, vertical and horizontal stalk structure, and the ratio between the woody plant and fruit trees, and carbon stock from the woody plants), and to know the hydrological functions of agroforest people forests.

Methods. The research activities will be conducted within 3 (three) years. The first year research is focused to obtain the spatial distribution data of people forests. The second year research is geared to use the spatial distribution data for the identification of the agroforestry characteristics. And the third year research is to determine the hydrologic functions from several types of agroforestry that are found, primarily associated with the erosion and runoff.

3.3. AGROFORESTRY AS AN EFFORT OF CLIMATE CHANGE ADAPTATION AND MITIGATION IN SMALL ISLANDS

Background

Ecologically, small islands are vulnerable to the global warming, hurricanes and tsunamis. Coastal erosion occurs because of the combination of those factors, and it is proved to be very progressive in reducing the shoreline within small islands. The result is a decrease in the number of living creatures, animals and even the human beings who inhabit in the island. Small islands are known to have a number of endemic species and high-value of typical biodiversity. If in case there are environmental changes on that area, it would be threaten its biodiversity and ecological functions. Based on the problems above, up to date, there is no classification regarding to condition of biophysical or socio-economy on the small islands that could be used as references in the allocation of natural resources management as an adaptation and mitigation of climate change on small islands.

The purpose of the study

To determine the potential local plant species for adaptation and mitigation of climate change, To find agroforestry patterns for soil and water conservation on small islands, Creating a microclimate as a mitigation and adaptation to climate change on small islands.

Benefits of the study

Finding potential local plant species for adaptation and mitigation of climate change, and Recommendations of agroforestry patterns for adaptation and mitigation of small islands.

Methods

The location is in Gili Trawangan. The distance from the location to the University of Mataram is approximately 60 km and takes 2 hours to travel. The research will be carried out during 7 (seven) month. The research is using qualitative and quantitative methods. Data compiling are using questionnaires, depth interviews, observation and FGD.

3.4. SEMINAR ON THE ROLE OF AGROFORESTRY IN MITIGATION AND ADAPTATION TO CLIMATE CHANGE: Agroforestry as the Wise Choice in Addressing Climate Change in the Forestry and Agriculture Sector

Background.

An action for mitigation and adaptation to climate change is very necessary and important to do. Development of mitigation and adaptation strategies must also consider the hydrological, social, economic, and environmental processes at global, regional, national, river basin, and local level. In everyday life, the farmers are plant, maintain and manage trees on various types of land they have, and realize or not, they have implemented agroforestry as a management pattern. But awareness of the climate change threat and the benefits of trees and plants that they planted are still lack. The important role of forestry and agricultural counseling agents as the spearhead of communication with the community could not be ignored. Therefore, it is necessary to improve the

understanding of the counselor associated with climate change. These skills are also necessary for academics to enrich scientific knowledge and skills in relation to climate change and society.

Purpose

To increase the understanding of practitioners and academics associated with agroforestry for climate change mitigation and adaptation, and provide technical knowledge for practitioners and academics to explain the role of agroforestry in the climate change mitigation and adaptation.

Participants

The seminar is expected to be attended by government officials as local policy makers, forestry cunselor as the spearhead of communication with the community, academics, and environmental activists associated with the agroforestry as a source of knowledge to be transmitted to the public. The number of participants are 50 people.

3.5.PROGRAMMED COUNSELING: AF and CC

Introduction.

Climate change that had happened these last few years in the sub district of North Coast Poso makes the cocoa farmers helpless because they could not harvest the fruit, so that the community tends to become farm laborers. Besides, the cocoa is cultivated on the slopes and most of them cultivate it in monoculture. Those situations make the cocoa to be critical, it means critical in the production and critical on its land. Besides turning to be farm laborers, the people are tend to leave the village to earn money and some are trying to open new land to plant cocoa. The opening of the new land will lead to increase the forest damage. However, it could not be avoided. Hence, it needs an effort of additional knowledge on plant cultivation for the community, such as programmed counseling.

Activity Objectives

The aim of the programmed counseling is to increase knowledge and skills of farmers so that the farmers are willing to implement their skill to a better agriculture system. And

Programmed Counseling Themes

Agroforestry systems could address the problems of farmers due to climate change.

3.6. NATIONAL SEMINAR ON CLIMATE CHANGE MITIGATION AND ADAPTATION THROUGH INTEGRATED FARMING SYSTEM (AGROFORESTRY)

Background.

Indonesia is one of the countries that are vulnerable to climate change, such as changes in precipitation patterns, temperatures, and the development of extreme climate events that gave a serious impact on the agricultural sector in Indonesia. Climate change directly and indirectly affect the agricultural production and socio-economic conditions of farmers as the most important subjects in the sustainable agricultural development. Response or action taken by the farmers and agricultural stakeholders on climate change will determine the future of agriculture and the livelihood and welfare of farmers. The most significant impacts of climate change in the agricultural sector is the degradation and deterioration of land and water resources quality, destruction of agricultural infrastructure, also the decrease in crops production and productivity. The impact of climate change will eventually pose a threat the vulnerability and susceptible to the food security and even poverty. These impacts will be suppressed or reduced on its intensity if the state policies are able to generate incentives for farmers and other actors in the agricultural sector to adapt and mitigate climate change as early as possible. Thus, it is necessary to have a real effort of the various actors in agriculture in climate change mitigation and adaptation through integrated farming systems as a form of shared responsibility, even in a micro, meso, and macro scale.

The aim of the national seminar on climate change mitigation and adaptation through integrated farming systems are: (1). To collect and formulate inputs from experts, practitioners, policy makers and stakeholders to determine the direction and strategy in developing an integrated agriculture system that maintains the role of ecological, socio-economic, and cultural according to the characteristics of each region in Indonesia, and (2.) To communicate and disseminate information, knowledge, technology from the research results, and organic materials based integrated farming practices that are being implemented and has successfully carried out in various areas in supporting sustainable and environmentally agriculture development.

THEMES

Policies and programs of organic materials based integrated farming development in relation to climate change mitigation and adaptation, Technology of environment-friendly integrated farming development, application of organic farming systems to support sustainable agricultural development, Integrated farming based prosperous village concept in order to create an independent agricultural community, and researches related to climate change mitigation and adaptation through integrated farming systems.

SEMINAR FEE AND SOURCE OF FUNDS

Seminar fee including seminar papers of keynote speaker, seminar kit, snack, lunch, and certificate. Each participant may order the proceedings of the seminar (hard copy + CD) to the committee. Seminar fee for under graduate students (S1) 50,000 IDR, post graduate students (S2 and S3) 100,000 IDR, lecturer / researcher 150,000 IDR, public/ private 150,000 USD, proceedings 100,000 IDR. Source of funding for the seminars are from Faculty of Agriculture, Government of East Kalimantan Province, NGOs, the private parties engaged in agriculture sector.

ABSTRACTS, PAPER AND POSTER PREPARATION GUIDE.

Abstracts; in English maximum 200 words, a complete paper consists of introduction, methodology. results and discussion, conclusions, appreciation/ gratitude (if any), and a bibliography,

3.7. THE ROLE OF SOCIAL CAPITAL IN THE AGROFORESTRY SYSTEMS TO THE CLIMATE CHANGE ADAPTATION

Background

Greenhouse gases have caused global warming and resulted climate change. This situation is decreasing the productivity of agriculture, including agroforestry. The uncertain beginning of the rainy season and dry season makes it difficult for farmers to determine the cropping pattern. Climate change also increasing pests and diseases. To overcome it, there are mitigation and adaptation. Mitigation is undertaken to reduce greenhouse gases which is the trigger of climate change. Adaptation is done to fit a variety of activities to climate change. Social capital is one aspect of agroforestry systems that influence climate change adaptation.

Purpose

This study aims to examine the role of social capital in the agroforestry systems of climate change adaptation.

Methods

The study will be conducted in the sub district of Bumiaji, Batu City and Ngantang, Malang district during April to June 2012.

Data collection: the data is collected by an interview during April-May 2012. The respondents were farmers, community leaders, and village officers.

Variables: The variable of research is social capital that consists of beliefs, norms and social networks. **Data Analysis**: The data was analyzed by descriptive qualitative method.

National Training on Climate Change Adaptation Strategies implemented by the Malaysian Network for Agroforestry Education (MANAFE)

NATIONAL TRAINING OF JUNIOR LECTURERS AND EXTENSION WORKERS ON CLIMATE CHANGE ADAPTATION STRATEGIES

March 13-16, 2011
SEARCA Residence Hotel
University of the Philippines Los Banos
College, Laguna
Philippines

HIGHLIGHTS OF THE NATIONAL TRAINING

RATIONALE

There is no way out to climate change. This natural and human-induced phenomenon is indeed being experienced worldwide, and the way to cope with it is to enhance the adaptation mechanisms of the agriculture sector, especially the farmers.

Southeast Asia is generally an agricultural region, and most of the human populace is engaged in farming. The small-scale farmers are definitely more vulnerable to the impacts of climate change in the sense that they have limited access to crop forecasting, basic agricultural and social services, and capital. These limitations would definitely contribute to the declining farm productivity. Given these, the agricultural technicians of the different local government units should be equipped with the knowledge and skills in educating these small farmers about the issue on climate change, and how farmers could mitigate and adapt to this global problem.

In line with this, the Philippine Agroforestry Education and Research Network (PAFERN), in collaboration with the member-countries of the Southeast Asian Network for Agroforestry Education (SEANAFE), namely: Indonesia (through the Indonesia Network for Agroforestry Education), Lao PDR (through the Lao Network for Agroforestry Education), Vietnam (through the Vietnam Network for Agroforestry Education), and Malaysia (Malaysia Network for Agroforestry Education) organized the in-country training of junior scientists and local extension workers. Being one of the project components of the APN-funded project "Institutionalizing Agroforestry as a Climate Change Adaptation Strategy through Local Capacity and Policy Development in Southeast Asia", this training course intends to convene the junior lecturers and the selected staff of the local government units that are providing technical and extension services to the upland farmers.

OBJECTIVES

The training course aimed to share the recent climatic changes in their respective areas based on the current state of agricultural production; explain the concepts, issues and impacts of climate change to the agriculture sector; assess the suitability of different climate change mitigation and adaptation strategies in their respective areas; and, prepare an action plan that is geared towards promoting appropriate climate change mitigation and adaptation strategies among the farming communities.

PARTICIPANTS

The training course was participated by 15 junior agroforestry lecturers from the PAFERN member-institutions and 19 agricultural technicians and environment and natural resources officers from the local government units. The details about the training participants are shown in Appendix Table 1.

TRAINING MODULES

The training course was divided into five modules as follows:

Module 1. Concepts and Issues of Climate Change

The first part of the training dwelled on the lecture-discussion about the Concepts and Issues of Climate Change that was delivered by For. Marlea P. Munez, the President of Women's Initiatives for the Sustainability of the Environment in the Philippines.

Module 2. Climate Change and its Effects and Impacts on Agriculture

This module discussed the current state of knowledge on climate change; effects and impacts of climate change on agriculture, food and water resources; responses to changing climate; and, the issues and challenges. Dr. Felino Lansigan, the resource person highlighted that climate change is indicated by the changes in the precipitation and temperature. The frequency of heavy precipitation events has increased over most land areas consistent with warming and increases of atmospheric vapour. There are also more intense and longer droughts observed since the 1970s, particularly in the tropics and subtropics. Among the climate change effects include the sea level rise, changes in global and circulation patterns, changes in hydrologic regimes, and more frequent and ore intense extreme events.

Most importantly, Dr. Lansigan discussed the impacts of climate change in agriculture, because climate and weather are important factors in crop production as crop growth and yield are defined by weather and climate variables. He also stressed the effects of climate change on water scarcity and natural disasters. As such, his lecture also dwelled on coping strategies in managing climatic risk. Among these include the conduct of seminars on environmental protection and flood response measures at the village level; education campaign among the citizens of communities about the nature of natural hazards and how to respond to these hazards safely and effectively; promoting improved crop production technologies; efficient agricultural extension services and programs; use of improved crop varieties particularly the drought-tolerant and stress-resistant varieties; improve water efficiency; synchronized growing season with water availability; identification of disaster-prone areas; strict implementation of mitigating measures in disaster-prone areas; enhancement of the comprehensive land use plans of local government units; crop or agriculture insurance; calamity support for smallholder borrowers; application of advances in science and technology in the development of action plans.

Module 3. Exploring Ways for Climate Change Adaptation

Module 3 tackled the different strategies for climate change adaptation. Dr. Ma. Victoria O. Espaldon, Professor of the UPLB-School of Environmental Science and Management emphasized that adaptive capacity is influenced not only by factors that promote or constrain the adoption of technologies and management practices, but also by the economic, political, social, environmental, institutional and

cultural factors that create both external and internal incentives as well as barriers to adaptation. She highlighted a range of adaptation responses as follows:

Classification	Examples
Bear the costs	Accept the costs because it is the most effective choice or because there is no other choice
Share the losses	Use insurance or government relief, or community or family sharing
Prevent or modify the events or the impacts	Change the actual physical events themselves (e.g. flood control; irrigation projects) or change human use activities (e.g. regulate flood plain land use; use drought-tolerant crops)
Change the use of natural resources and relocate socio-economic systems	Use flood plains for recreation, parking areas or wildlife instead of agriculture or housing; avoid expanding agriculture into unsustainable moisture-deficit regions
Research and/or restore	Study adaptation alternatives, identify new alternatives, remedy past mistakes

Adaptation, according to Dr. Espaldon can also be classified as anticipatory or proactive, which may include the purchase of insurance, construction of house on stilts, early warning systems, incentives for relocation; or it could also be reactive such as the change in farm practices, change in insurance premiums, compensatory payments or subsidies, changes in the length of growing season, and others. In addition, there can be a staged approach to adaptation as follows:

- Stage 1. Planning through studies to identify vulnerabilities, policy options, and appropriate capacity building
- Stage 2. Identifying measures to prepare for adaptation and further capacity building
- Stage 3 . Promoting measures to facilitate adaptation, including insurance and other adaptation interventions

Dr. Espaldon, stressed, however, that we should move away from the staged approach to adaptation, instead, there is a need for “portfolio approach” that identifies major types of interventions that can be taken up across sectors relevant to sustainable development. These interventions may include mainstreaming activities, technology development and transfer, and insurance. Therefore, there is a need for focused research on methodologies for mainstreaming adaptation; development and diffusion of technologies for adaptation in developing countries; public-private partnerships for mainstreaming as well as technology development and transfer; innovative funding mechanisms that provide automaticity for resource generation.

Module 4. Organic Agriculture as a Climate Change Adaptation Strategy

This module tackled the potentials of organic agriculture in climate change mitigation and adaptation. Dr. Teodoro C. Mendoza, Professor of the UPLB-Crop Science Cluster, emphasized that organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Dr. Mendoza also highlighted that organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

For one, there is no application of chemical fertilizers in the agricultural production systems, and thus, organic agriculture decreases the emission of nitrous oxide and decreases the release of carbon dioxide as well. Since there are no pesticides manufactured using fossil fuels, therefore, there is less carbon dioxide emissions through erosion, and the soil structure becomes better. Second, organic agriculture sequesters carbon dioxide, thus, it enhances soil carbon sequestration through the application of animal/green manure, and crop/weed residue . According to Grain (2009), the estimated carbon offset of organic agriculture is 24-30% of the current global annual greenhouse gases emissions.

Because organic agriculture is a diversified farming, it places emphasis on permanence of tree integration in the agricultural landscape. The trees/wood and fruit trees help in the microclimate enhancement; serves as windbreaks, and acts as nutrient pumps.

Dr. Mendoza also stressed that organic agriculture can sequester about 33.61 Mt carbon dioxide in the Philippine landscape. This is distributed as follows:

- Green manuring - 9.12 Mt CO_2
- In-situ composting or crop biomass recycling - 11.66 Mt CO_2
- Tree-integration in the agricultural landscape - 12.85 Mt. CO_2

Module 5. Potentials of Integrated Pest Management in Climate Change Adaptation

Dr. Merlyn Lit, Researcher of the UPLB-Institute of Plant Breeding highlighted the importance of Integrated Pest Management (IPM) in climate change adaptation, such that the prevention and control of pests in the farm depends on proper farm planning and management. The control measures may be natural or biological, mechanical, cultural or chemical or a combination of any of these measures. Dr. Lit emphasized that not all insects are pests, as there are some insects who could help control the pests.

IPM dwells on soil-nutrient management, water management, diversified farming/crop diversification, crop rotation, avoidance of the use of chemical fertilizers and pesticides, and farmer-led technology generation.

Module 6. Potentials of Agroforestry in Climate Change Mitigation and Adaptation

Dr. Roselyn F. Paelmo, Researcher of the UPLB Institute of Agroforestry discussed the concepts of agroforestry, a land-use management system that involves the integration of agricultural crops with perennial or woody plants such as fruit trees and forest tress, and/or livestock and aquaculture, in the same piece of land, for the purpose of socioeconomic productivity of the farmers, and ecological stability. She highlighted the different types or models of agroforestry system to include the

agrisilvicultural system (or the combination of agricultural crops and forest tress), agrisilvipastoral system (or the combination of agricultural crops, forest trees and livestock), silvipastoral system (or the combination of forest trees and livestock), and complex agroforestry system (combination of any of the different types of agroforestry system).

The role of agroforestry in climate change adaptation is centered on the diversity of the crops that are found in an agroforestry system. This implies that if other crops may be negatively affected by climate change, there may be some other crops which can compensate for the loss of other crops. Another factor is the variety of benefits that can be derived from the agroforestry system. These include food, shelter, fodder, fuelwood, and others, including the indirect benefits or the service roles such as controlling soil erosion, enhancing the microclimate in the farm/community, promoting biodiversity, among others.

FIELD VISIT

The participants visited an Organic Farm in Bay, Laguna. The farm showcases crop diversification, and the use of household and farm wastes as organic fertilizers.

ACTION PLANNING

To be able to apply the knowledge and skills gained from the different training modules, the participants were required to develop re-entry plans or indicative plans. The plans revolved around the appropriate climate change adaptation strategies that they wish to incorporate in their institutional program, or introduce to their partner communities and organizations. The participants were grouped according to their geographic or regional representation.

PARTICIPANT	A. Jose Lucas B. Millare
INSTITUTION	Abra State Institute of Science and Technology Lagangilang, Abra
PROPOSED PROJECT	Climate Change Adaptation Strategies for the Agriculture Sector in the Municipality of San Juan, Abra
SITUATIONAL ANALYSIS	San Juan is one of the 27 municipalities in the province of Abra. It is traversed by the Malanas River creating alongside productive agricultural areas. It falls under the first climatic type – dry from November to April and wet during the rest of the year. Its prime products include palay, corn and a variety of vegetables. For the past 30 – 40 years, the levels of production is very high, however, during the middle part of the 80s production starts to decrease significantly up to the present. The decrease is believed to be due to unpredictable and disastrous weather conditions. During these days, it is observed that the usual dry and wet periods have been altered resulting to disturbed planting calendars. During the dry months water is so scarce coupled with a very high temperature. On the other hand, excessive volume of water is experienced during the rainy months causing huge damage to crops and other farm resources. Erosion is also prevalent dislodging great volume of fertile top soils. In order to prevent further damages/losses, farmers are employing temporary and conventional remedial measures like planting of low water requirement crops during dry months and crops that are resistant to water logging during the rainy days. In addition, water harvesting techniques were also employed to supplement the water requirement during dry periods and rehabilitation and monitoring of water conveyors during rainy season.

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Unpredictable rainfall pattern	Analysis of rainfall events to come up with a pattern	Installation of rain gauge station. Coordinate with DOST provincial field office.	Planting calendar	LGU - ASIST Acquisition of the apparatus	Meteorological apparatus. Budgetary allotment	One month
Scarcity of irrigation water during dry months	Proper crop matching and selection	Introduction of drought resistant rice varieties. Planting of low water requirement crops (e.g corn & vegetables		LGU Provides subsidy to farmers (seeds, fert.) Provides technical assistance to farmers. Provides the funds needed	Seeds and fertilizers. Construction materials. Irrigation materials. Planting materials Man power requirement	One month

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
	Construction of appropriate water storage facilities	Construction/rehabilitation of irrigation dam. Construction of SWIP.Drip irrigation installation	Insured harvest/Income	LGU Provides subsidy to farmers (seeds, fert.) Provides technical assistance to farmers. Provides the funds needed	Budgetary allotment	Two years
	Watershed rehabilitation and protection	Rainforestation Enrichment planting Maintenance & protection	Improved watershed cover	ASIST Provides training/tech. assistance to farmers.		Four years

PARTICIPANT	Gerald Zaragosa					
INSTITUTION	Wester Visayas College of Science and Technology Leon, Iloilo					
ACTION PLAN						
Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Limited water supply of water	Construction of multipurpose water impounding structure	Site identification Planning with beneficiaries Establishment of pilot project Monitoring and evaluation	Address the need for water especially during drier months	Conduct information campaign Provide technical assistance Create linkage with other agencies for funding support	Funding support Technical assistance	May – June 2012
Changes in weather pattern	Diversified farming or agroforestry	Information education on climate change impacts Establishment of pilot AF farm	Improve farm production	Conduct awareness campaign Provide technical assistance	IEC materials Planting materials Financial assistance	3rd quarter of 2012

PARTICIPANT	Dennis Yamuta
INSTITUTION	Misamis Oriental State College of Agriculture and Technology Claveria, Misamis Oriental
PROPOSED PROJECT	Claveria Climate Change Adaptation Strategies Project
SITUATIONAL ANALYSIS	Claveria is an upland farming community in the province of Misamis Oriental. The place practically occupies almost 1/3 of the province. It forms part of a bigger watershed area that drains in the Cabulig River and finally emptying itself at the Macajalar Bay. A number of coastal towns benefit from its fresh water supply and farm produce. However, this benefit is threatened by the felt effects of climate change. It was observed that weather patterns became very variable. The dry months were very dry and the rainfall during the rainy months was also excessive. The timing in the change of season was becoming irregular. When supposedly it was dry season but rains still continued to come. The deficiency of freshwater supply in the Poblacion area, being itself seated in a plateau, was aggravated by the ultimate drying up of a number of its source. The good timing for planting is becoming uncertain. Although, some farmers are gaining from these changes in the meantime but are not quite sure if this gain can be sustained. Most farmers have already resorted to change the planting calendar and are now into choosing appropriate varieties of crops to be planted. To sum it up, it was alleged that farmers' income and their produce were greatly affected negatively. Though, all these may be happening but concrete data has yet to be collected and analyzed. However, efforts of the local government unit of Claveria, the concerned government agencies, non-governmental organizations, people's organizations, and the academe have yet to synergize to precipitate set of things to do and help farmers and community folks alike to adopt adaptation strategies to combat the impacts of climate change.

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Disturbed cropping pattern	Ultimate shift to appropriate AF farming system. Use of appropriate planting calendar	Conduct of IEC Technology Needs Assessment (TNA) Capacity building Monitoring Research & Ext	IEC materials Technology needs assessed Training /seminar conducted Appropriate AF farming systems established Res & Ext proposals	WAC-ICRAF – tech. expertise IAF – tech. expertise MOSCAT – trainers LGU – fund source MAO MARO	Trainers/ experts Fund/logistic support Land-use data	Q2 2012 Q3 2012 Q4 2012 Q1 2013 (start) 5 years

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Incidence of pest and diseases	Gradual shift to Organic Agriculture/ IPM	Conduct of IEC TNA Capacity Building Monitoring Research & Ext.	IEC materials Technology needs assessed Training /seminar conducted Res & Ext proposals Farmers are doing Organic Agriculture	MOSCAT – trainers LGU – fund source MAO – trainers DA (Prov. & Reg)	Trainers/ experts Fund/logistic support Manpower resources	• Q2 2012 • Q3 2012 • Q4 2012 • Q1 2013 5 years
Drying up of water source/s / scarcity of water supply for agriculture	Reforestation wise use of water/ 3-Rs rain water harvesting use of appropriate irrigation system	Conduct of IEC Conduct of "Tree-Growing" activity Monitoring Res & Ext	IEC materials Conducted series of information caravan Conducted series of "Tree-Growing" activities Communities/farmers harvest rainwater Appropriate irrigation system established/ used by farmers Res & Ext proposals	LGU/MENRO – for seedlings MOSCAT – advocacy MAO NGO LWUA – for funding support SK – manpower support	Fund/logistic support Technical expertise (MOSCAT) Manpower resources	• Q3 2012 • Q2 2012 • 3 years

PARTICIPANT	Rizalyn Medrano					
INSTITUTION	LGU-San Fernando City, La Union					
ACTION PLAN						
Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Increased rainfall	Widening of roads	Sourcing out of funds and assistance	Decreased flooding esp in CBD; Reduction of Traffic congestion	International and local partners: ICLEI, DPWH, Engineering Office, Office of the Cong., Office of the Governor	Fund, manpower	2012- 2015
	Construction of roads with slope protection and drainage	Tap other agencies to support and provide funds	Prevent erosion esp in upland areas and flooding in lowland areas			
	Improvement of drainage system		Prevent flooding			
	Enhanced Solid & Liquid Waste Management	City-based SWM (ESL) Barangay-based SWM (clustering) School-based SWM (Recycling Septage Management Project Eco-tank Project Market & Slaughter WTF	Prevent land, air, water pollution	SWAPP, DENR, Barangays, USAID, Rotary International	Fund, manpower	2012 onwards
	Water resource management	Rainwater harvesting Installation of ferro cement tanks Installation of pavers along sidewalks	Water conservation; Increase water supply	International and local partners: ICLEI, DPWH, Engineering Office, Office of the Cong., Office of the Governor; DENR; DA; City ENRO	Fund	2012 onwards
	Revival of the Mini-weather station	Provision of additional equipment	Localized Weather Forecasting system	Baseline meteorological data	Fund Manpower	2012

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Increased Temperature	Reforestation and Greening Program	Urban greening Adopt-a-Hectare Project One-Million Tree Project Tree Parenting Project Seedling Production and Distribution Enhanced Agroforestry Project Public Private Partnership on Bamboo Development Project	Increase carbon sequestration; Improved air quality; Prevent flooding	International and local partners, NGOs, NGAs, POs, DENR, Barangays, Tanim Kalikasan, PCAARD, ILARRDEC, Provincial Gov't of La Union, Barangays, Bamboo Weavers Association, Holcim Phils Inc, DENR, DA	Fund, manpower	2012 onwards
Sea Level Rise	Integrated Coastal Resource Management	Co-Management of Salvage Zone	Prevent pollution; prevent coastal erosion; improve water quality	DENR, Beach Shed Owners Association, DTI, Citynet, Rotary International, USAID		2012 onwards

PARTICIPANT	Maricon Perez					
INSTITUTION	Isabela State University-Cabagan Campus					
ACTION PLAN						
Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Decreased in crop yield/ production (corn/rice/ vegetables)	Shifting from monoculture to mixed cropping system	Conduct of research studies on varietal adaptability to climate change/variation of climatic conditions	Identified varieties suitable/adaptable to current variation of climatic conditions	SUC's/DA (conduct research on varietal adaptability and species mix) DA (conduct field experiments or trials, monitoring of harvest per cropping of selected varieties)	Technical expertise (farm technicians, researchers/ experts: agriculture, economics, natural resources management	May 2012-onwards
		Conduct IEC on current climatic conditions and its perceived effects to people, crops/plants, animals and businesses	Awareness to current climatic scenario	LGU (implement policies related to the adoption of species diversification or mixed cropping in the locality) SUC's – (production of IEC materials and conduct of intensive IEC activities through its Extension units (College- or Campus-based)	IEC materials (flyers, leaflets) Information campaign through local newspapers and radio programs (eg. CFEM-on-the-Air Program on DWRA 99.5FM) SUC's Extension fund for IEC &IEC fund from LGUs	May 2012-onwards
		Conduct consultative meetings with farmers	Conducted 3 consultative meetings with upland/lowland farmers	LGUs/DA/SUCs (recommend tested/suited varieties for adoption based on research and field trial/experiment findings)	Extensionists Budget on trainings/ meetings/IEC (LGUs/DA/SUCs Funds)	May 2012-onwards

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
		Conduct of training, seminar, workshop, field visits	Conducted 3 consultative meetings with upland/lowland farmers	LGUs/DA/SUCs (conduct training, seminar, workshop, field visits on demo farms eg. CFEM Ecological trail project/SUCs demo-farm; private demo farms)	Extensionists/ Technical expertise Budget on trainings/ meetings/IEC (LGUs/DA/SUCs Funds)	May 2012-onwards
Flooding occurrence coupled with fast movement of water in the upstreams causing unexpected swelling of rivers	Assessment of watershed area	Conduct landuse assessment (updating of landuses)	Assessment of the changes in landuses (shift and intensification of landuses) by producing new maps incorporated in CLUPs Revision of CLUPs	LGUs (updating of CLUPs) DENR/SUCs (conducts ground verification, interpretation and and revision of landuses)	Technical expertise Budget on watershed assessment from DENR,LGUs,NIA; SUCs project funds from related activity - internal or externally funded	May 2012-onwards
			Assessment on the number of people adopting SWC measures and organic farming in their respective farms, schools and other government lands	LGUs (updating of CLUPs to include SWCs and adoption of organic farming) SUCs (demo farm adopting SWCs and organic farming methods)	Technical expertise LGU budget (CLUPs updating) SUCs Fund 101 &164 – Extension funds	May 2012-onwards
		Tree planting activities	Establishment of Barangay Nurseries through SUCs Adopt-A-Barangay project Conduct of tree planting activities along barren national high-ways; steep and bare grazing areas of the school's reservation	SUC's and Barangay nurseries (Source of seedling: fruit trees and forest trees) LGUs (conducts the same at their capacity)	SUCs and LGUs (Labor) SUCs – shoulders schools seedling costs LGU seedlings ether sourced from schools or barangay nurseries	May 2012-onwards

		Infrastructure checkup and maintenance	Conduct of quarterly monitoring and maintenance of irrigation canals, dams, roads, major waterways/ tributaries	Monitoring and maintenance by: • NIA (irrigation water infrastructures) • DENR (Upper to lower streams) • SUC's (assists DENR through its projects and laboratory exercises) • DPWH (roads and bridges) • LGUs (drainage canals)	Technical expertise Budget on watershed assessment from DENR/NIA;SUCs project funds from related activity - internal or externally funded	May 2012-onwards
		IEC and Strict implementation of the Solid Waste Management Program	Small MRF for all offices and schools in the area Monitoring of the proper waste disposals in the area (in terms of segregation and area for disposals)	SUCs and LGUs (M&E for the implementation of proper solid waste management)	LGU Fund on Solid Waste Mgt. SUCs- Fund 101 &164 for the establishment of small MRFs	May 2012-onwards

PARTICIPANT	Ms. Patricia Abibico Engr. Freddie Adop Dr. Emerson V. Barcellano Tabuk, Kalinga
INSTITUTION	LGU-Tabuk and Kalinga State College
PROPOSED PROJECT	Climate Change Adaptation Strategy in Tabuk, Kalinga
SITUATIONAL ANALYSIS	The city of Tabuk is the convergence zone or the melting point in the province of Kalinga. It is an agricultural community but through the years, the municipality turns to be the center of urbanization in the province. Through time, environmental condition in the changes, thus causes imbalances in the environment. Some of the threats to the environment are the improper disposal of wastes generated, air and water pollution, increasing human population, land-use conversion, and many others. Agricultural productivity in the province becomes erratic due to these scenario.

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
DECREASE FARM PRODUCTIVITY due to unpredictable rainfall pattern	- Protection of Watershed - Adjust planting calendar - Planting of resistant varieties	- Rainforestation - Agroforestry - Installation of Automatic Recording Raingage - Construction of SWIP - Construction of series of dams - Provision of water pumps - IEC	- Sustainable crop yield	*LGU Tabuk = Fund sourcing =Technical/ Financial Assistance * KASC = IEC = Technical Assistance	*Budget *Technical experts	May 2012 ONWARDS
OCCURRENCE OF PEST AND DISEASES	Integrated farming	IEC	Practicing IPM			
ECOLOGICAL IMBALANCE	Rainforestation Agroforestry	IEC	Balance Ecology			

PARTICIPANT	Rodriga Aguinsatan					
INSTITUTION	Central Mindanao University					
ACTION PLAN						
Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Increased upland farm production & income losses	Shift to mixed cropping/diversified farming	Conduct intensive awareness campaign on the current climatic conditions/status on identified vulnerable sites	Well-informed upland farmers on selected sites	**LGU**- inform the constituents on the campaign schedules & motivate them to attend; provide financial assistance needed; make & implement policies on the adoption of diversified farming system or AF **CMU**- Provide experts/resource persons on climate change & agriculture related issues **CVO**-Help facilitate the flow of information/ communication **NGO**- provide assistance both for technical & financial needs of the campaigns **LDC** – recommend policies for the implementation of diversified farming system or AF in the uplands	Vehicles, experts/technical persons, funds/budget	w/in 1st sem of SY 2012-13
		Establish at least 1 ha. AF model farm in the university	Not less than 1-ha AF model farm established	**CMU**- provide the land area, hire job order laborer to take care of the farm	Land, manpower, initial capital	1st sem 2012-13 to 2nd sem 2014-15
		Conduct at least 2 seminar-workshops/training per sem for 4 yrs. On:	At least 8 seminar-workshops/training conducted	**CMU –**provide experts/resource persons NGO- provide both technical & Financial	Training budget of not less than 5t/training	1st sem 2012-13

		a)AF technology		assistance		
		b)Farm mgt practices that reinforce SWC				2nd sem 2013-14
		c)conservation agriculture				1st 13-14
		d)organic fertilizer making using diff.sources				2nd 13-14
		e)upland ecosystem livelihood projects				1st & 2nd of 14-15
		f)other related trainings				As the need arises

PARTICIPANT	For. Priscillo Barrameda
INSTITUTION	Mindoro State College of Agriculture and Technology Alcate, Victoria, Oriental Mindoro
PROPOSED PROJECT	Promotion of Climate Change Awareness and Climate Change Adaptation Strategies to Farmers of Victoria, Oriental Mindoro

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
1. Low Production 2. Pests and Diseases in both crops and animals 3. Post harvest problems (esp. in rice)	Practice of OM application Change in cropping pattern/farming calendar Application of Organic Pesticides to crops (e.g. wood vinegar, vermi tea, etc.) Animal houses for animals (e.g. barn for goats, etc.) Flat bed dryers	Coordination with the LGUs (Provincial, Municipal & Barangay) Coordination with the DA-ATI Coordination with OM producers in the Province Training Design Farmers Training Materials Support (OM)	Awareness of farmers to climate change Farmers to acquire knowledge on how to adapt to climate change Less use of inorganic farm inputs Avoidance of pests and diseases High production Good linkages	1. MinSCAT 2. LGUs: - Provincial Government - Municipal Government - Barangays 3. Department of Agriculture (DA-ATI) 4. OM producers	<u>MinSCAT:</u> - Technical assistance: Training - Source of materials: Organic fertilizers/inputs <u>Provincial/Municipal Gov't./DA-ATI:</u> - Funding for Organic Materials, Trainings, Flatbed Dryers, etc. <u>Barangays:</u> - Coordination/information dissemination to farmers <u>OM producers:</u> - Source of OM	**April-December, 2012:** - Planning, Coordination with LGUs, DA-ATI and OM producers - Training if possible (MinSCAT) **January-December 2013:** Farmers Training and application

PARTICIPANT	Mario Hipolito and Mario Abana
INSTITUTION	Provincial Government of Cagayan Tuguegarao City, Cagayan
PROPOSED PROJECT	
SITUATIONAL ANALYSIS	

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Unpronounced Weather Situation	Rehabilitation of degraded watershed areas	Seedling production (forest and fruit trees)	1,000 grafted mango 1000 grafted rambutan 80,000 forest tree seedlings	PNREO	300,000	Jan-June
		Tree planting within existing SWIP and reforestation project areas	4 SWIP areas rehabilitated 200 has. planted		470,000 367,550	Jan-Dec Jan-Dec
		DBP forest project	70 has. planted		610,000	Jan-Dec
	IEC on Environment and Climate Change Adaptation	Conduct lectures, film showing, and distribution of flyers and other information materials	20 municipalities 30 barangays 40 schools	PNREO	15,000	Jan-Dec
	Provisions of technical and financial assistance in FLUP formulation	Initiate the conduct of various processes in FLUP formulation	One (1) municipal FLUP drafted	PNREO, DENR, MENRO, TWG	100,000	April-Dec
	Support in the protected area proclamation	Spearhead the conduct of different steps in PA proclamation	Two (2) municipalities to be proclaimed	PNREO, DENR, MENRO, and other stakeholders	300,000	April-Dec
		Fabrication of concrete monuments for ground demarcation	300 concrete monuments fabrication	PNREO and other stakeholders		
		Capability-building for PAMB members	30 PAMB members capacitated	PNREO, DENR, LGU		

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
	Coastal clean up drive	Initiate the conduct of coastal clean up drive along rivers and coastal areas with the involvement of schools, barangays, religious groups, etc.	Cleaning of water wastes and canals Collection garbage within the coastal areas	PNREO	190,000	April-Sep
	Search for the cleanest barangay/municipality and best implementor of solid waste management	Invitation of schools, LGUs (brgy/municipal) for their participation Evaluation proper Giving of cash awards to winners	30 schools 20 barangays 10 municipalities	PCSD (PNREO, DOLE, DOST, DENR, DA, DEP-ED, HEALTH, NGO's)	1,132,500	July-Dec
	Performance evaluation of ISF project beneficiaries	Actual area validation/Assessment of planted area	5 project sites evaluated	PNREO, CENRO, MENRO	50,000	April-June

PARTICIPANT	Melvin Disomimba
INSTITUTION	Mindanao State University Marawi City
PROPOSED PROJECT	Agroforestry Tungo sa Maunlad na Pagbabago
SITUATIONAL ANALYSIS	Lanao del Sur is one of the four provinces of Autonomous Region in Muslim Mindanao. It is where the largest fresh water in the Philippines is located which serves as natural reservoir for NPCs Agus grid hydroelectric power plants, generating roughly 50 % of the total electricity needs of Mindanao. It is also central to the history, culture, religion and livelihood of the Mranaos. The province has a total land area of 450, 453.539 Hectares. About 27% of which is a closed canopy forest, 17% is open canopy forest, 7% is tree and perennial crop plantations and only about 22% is cultivated areas (DENR-ARMM, 2010). Literally, the province has still intact forest cover. Recently, flooding was observed in the province particularly in Bubong River and Gata River where it is very unusual thus, resulted to poor agricultural production and damages of infrastructure. Frequent landslides in several areas were also observed because of prolonged heavy rains thus affected the farmers. Many of our "very few farming communities" has stopped farming and engaged into other businesses because of the current institutional arrangement has not addressed the deteriorating agricultural production and environmental degradation of Lake Lanao and its environs.

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Deterioration of Lake Lanao and Its Environs	Adoption of Agroforestry System and Watershed Protection	Capacity/Capability Building on Lake Basin Management	Trained Extension Workers	SUCs LGU (Provincial & Municipal)	Technical Assistance Financial Assistance/Funding	Short Term (1yr)
		Information, Education & Advocacy Campaign on CC	Ecologically & Spiritually Informed Community	SUCs/Madaris/LGUs/GAs		Short Term (1yr)
		Popularization of Al Khalifa				
		Establishment and regular updating of Reliable Database	Baseline/Database Literature	SUCs LGUs DENR/DA/DAR/DAF/AFP	Technical Assistance Financial Assistance	Medium to Long Term (1-3yrs)
		River Banks Stabilization	Reduced Sedimentation	LGU DENR CSO	Planting Stock/Materials	Short Term (1yr)
		Advocacy and Adoption of Organic Farming	Food on the table Healthy Lifestyle	LGU POs CSO	Subsidy on Organic Farm inputs	Medium to Long Term (1-3yrs)
		Establishment of tree	Locally grown tree spp.	LGU DENR	Subsidy on Seed inputs	Medium to Long Term (1-3yrs)

		nurseries		CSO		
		Replacement of invasive spp. In the lake	Sustainable inland fish supply	LGU DAF	Subsidy on non-invasive spp. Fingerlings inputs	Short to Long Term (1-3yrs)
		Conduct of researches and studies on Biodiversity of Lake Lanao	Literature	SUCs Research Institutions	Technical Assistance Funds	Short to Long Term (1-3yrs)
		Implementation of existing policies, laws & ordinances	Effective Governance	All line agencies, CSOs	All available resources	Long Term

PARTICIPANT	Darwin Totaan
INSTITUTION	Pampanga Agricultural College Magalang, Pampanga
PROPOSED PROJECT	PAC AND LGU-MAGALANG PARTNERSHIP ON CLIMATE CHANGE ADAPTATION USING AGROFORESTRY AND SELECTIVE POLICY IMPLEMENTATION

ACTION PLAN

Climate change impacts	Proposed adaptation strategies	Specific activities	Expected output	Local organizations and their roles	Resources needed	Timeframe
Decrease in agricultural productivity (quantity and quality)	Cropping pattern evaluation IEC activities	Conduct research by PAC and farmer cooperators Series of trainings local climate change scenario	Dissimination of result outputs and come up with training manual	SCU-Reseach Consortium – financial support in research LGU-SCU – policy formulation and implementation	Financial and human resources	3 – 5 years
Water shortage during cropping season	Application of appropriate cultural practices anchored on sustainability	Develop demo farms showcasing improvement on ecological and economic aspects	Improve farming systems with sustainability	SCU-Reseach Consortium – financial support in research LGU-SCU – policy formulation and implementation	Financial and human resources	3 – 5 years